

AN ECONOMIC HISTORY OF ENGLAND

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To
E. W. D.



PREFACE

THE perennial interest of American students in the economic development of England represents an important aspect of their effort to get at the roots of the problems of technological progress and its reactions upon social life. English economic history presents a survey of the long past of that nation which best preserves, in a relatively great mass of documentary materials, the story of its development from the simplest to the most intricate arrangements. As a result of England's early political unity the presence of sharply differentiated economic provinces was avoided, so that there is an integration to her history which is lacking in other countries. Moreover, during the eighteenth and nineteenth centuries, the critical period of the development of capitalist society, England held the lead in commercial and industrial progress and set the pattern for the western world.

For the study of English economic history few texts have hitherto been available which, written in the American idiom, approached the story from the point of view of the American student. The present volume is intended to give to American students a picture of how Englishmen have made their living over the centuries, how changes in the ways of doing things came about, and how political and social life influenced and have been influenced by economic problems as time went on. Many knotty questions, which have but an antiquarian or local interest, and traditional arguments in old controversies, which may be regarded as settled, have been omitted. In view of the peculiar importance of public finance in economic history, a series of chapters deals somewhat more fully with fiscal problems than is usually done.

During the late 1920's and the 1930's a group of brilliant English scholars, setting out to re-examine their economic history in detail, published numerous scholarly articles, particularly in the *Journal of Economic History* and in the historical supplement to

the *Economic Journal*. As these studies multiplied they stood strongly in need of being brought together into a new picture of England's economic past. While this text is by no means a complete synthesis of this important research, many of the discoveries of these scholars have been incorporated into this present volume.

The bibliographical notes at the end of each chapter are designed to help students with suggestions for further reading. Articles in scholarly journals generally have been omitted, since these are inaccessible to college students. Older works, printed before 1900, of which many lists are available, likewise generally have been omitted, and the emphasis has been placed upon the presentation of the newer books which represent the best generally available treatments of the problems they handle.

F. C. D.

March 10, 1942.

University of Illinois

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Chapter 1

THE LAND AND THE PEOPLE

THE PROBLEMS in economic history which chiefly concern our attention are how the work was done, and how the social surplus (or such parts of the production of each year not required to feed the population or to improve the productive units) was dealt with, distributed, and used. In considering the way men obtained their living it is necessary to inquire into the technical equipment of the age, the inducements used to get men to put their backs into their jobs, and the way in which supervision and direction were provided. The problem of the social surplus involves the standards of comfort by which men lived, the fictions employed to justify the saving and mobilization of the annual surplus of production, the groups which came to be intrusted with its use, and the disposal they made of it. Among these factors the matters of the provision of technical direction and of the ultimate use of the social surplus are especially important as giving character to an age.

During all but the last centuries of her history England, together with the rest of Great Britain, has been primarily an agricultural country. Down until about 1750 the larger part of her people gained their living from the cultivation of the soil, and the greatest percentage of the wealth of the country came from farms. Since 1750 the emphasis has shifted. Commerce and industry, including manufacturing, mining, and transportation, are now the chief employment of the people and the major source of British wealth.

It is obvious that the significance of the various geographical factors is not always the same. When the British people depended chiefly on farming, the emphasis was upon the surface soil and the circumambient atmosphere. Since Britain has become a great industrial nation, what is under the ground in the way of minerals, the lie of the land and accessibility to markets, facilities of internal

and overseas communication, and the availability of sites for cities have become crucial problems.

In the study of geographical factors influencing British economic history those enduring features which were most outstanding in the period when the island was primarily an agricultural area may be considered first. This discussion will be followed later by an examination of the factors which made for commercial and industrial development.

It has been estimated that 5 per cent of the substance of vegetation derives from the ground and 95 per cent from the moisture, air, and sun. Such considerations make it essential to stress climatic characteristics in the study of geographical fundamentals.

The island of Great Britain, extending over six hundred miles south to north, lies between approximately the fiftieth and fifty-ninth degrees of north latitude. London, situated between the fifty-first and fifty-second parallels, is about seven hundred miles north of New York City, and John o' Groat's House, in the extreme north of Scotland, is on a line with Juneau, Alaska.

In spite of Britain's northern position, which might be expected to be accompanied with rigorous and inclement seasons, the country enjoys a mild and equable climate. This fact is due in large part to a favorable combination of winds and ocean currents. In three directions from Great Britain there are three permanent or alternating weather centers. Off to the northwestward, there is a nearly fixed center of low atmospheric pressure lying south of Iceland. Southeastward and eastward is the monsoon area of eastern Europe and Asia, with low pressures in the summer and autumn and extremely high pressures in the winter and spring. In the vicinity of the Azores lies an Atlantic area of permanent high pressure.

During the winter and spring, under the influence of the Icelandic low pressure area and the high pressure area of Asia, a southwesterly current of air carries moisture and warmth from the warmer parts of the Atlantic across Britain. The wind drives before it a set of the oceanic surface from the tropical latitudes. This drift, which is popularly known as the Gulf Stream, carries the stored-up heat of the summer sun from the regions of the middle Atlantic and makes this warmth available for tempering the climate of Great Britain and the rest of western Europe. Indeed, without this heat carried by the southwest wind and the

surface water drift, Great Britain, and neighboring countries too, would be desolate and uninhabitable. As it is, most of Great Britain has an average January temperature of between 40° and 38° F. In the west there are some sections which have an average January temperature of over 42° . Only in parts of Scotland, small areas in northern England, and sections along the east coast of England does the average January temperature fall below 38° F.

As the spring and the summer of the year come on, the Icelandic depression area loses its importance. The Atlantic high pressure area moves toward the north, the Asiatic high pressures give way to low pressures and the winds, driven by the high pressures of the Azores, become westerly rather than southwesterly. The temperature rises, but the very factors which kept the temperature up in winter prevent excessive heat in the summer. Throughout nearly the whole of Great Britain the average temperature for July does not exceed 64° . London has an average January temperature of 39° and an average July temperature of 64° F. New York averages 31° in January and 74° in July.

Rainfall and Cloud

The winds and the ocean waters which moderate and equalize the temperature of Great Britain are responsible for other climatic factors, particularly rain, humidity, and cloud. The whole of the island has an abundant rainfall, ranging from over 80 inches a year in parts of the Scottish highlands and from 40 to 80 inches in much of the western half of the islands down to under 25 inches a year along the eastern coast of England. At the Ben Nevis observatory in Scotland the average fall is 151 inches a year; at Nairn on the east coast, 24 inches. The greater rainfall of the western half of the island is to be explained by the fact that the Atlantic storms sweeping past the western shores extend their rainy quadrants over the land. Furthermore, this part of Great Britain contains the highlands and mountains. These force the moisture-laden air from the sea upward as it passes over them. The air expands a little as it rises, loses temperature, and lets down its moisture content in the form of drenching rain. The eastern half of the island, on the other hand, is not infrequently visited by anti-cyclones, which tend to produce drier weather.

The concomitant of rain and moisture is cloud. The rainy

north and west have more cloud and less bright sunshine than the south and east. In parts of the south there are 1700 hours a year of sunshine; in the mountains of Scotland, Wales, and northern England there are less than 1200 hours a year.

All this has a very important effect on the nature of the vegetation which the soil of Great Britain can produce. In prehistoric times the land was covered by dense forests. Of these only a few small tracts remain at the present time, but many small woodlands of more recent planting are to be found.

The crop most suited to the British climate is pasture grass. "The humidity of the air maintains its verdure: the frequent rains supply its growth." Pasture grass became the natural crop when the forests were stripped away, and all through British history pasture and the grazing of sheep and other stock have formed a most important element of British economy.

The growing of cereals has always been subjected to great disadvantages in most parts of the island, even though down to the present time it forms the main agricultural occupation of the southern and eastern lowlands. It has been estimated that a temperature of not less than 42° F. and a rainfall of not less than eighteen inches are necessary for the successful growing and maturing of wheat. Over a period of eighteen years, from 1878 to 1895, the Rothamsted agricultural experiment station kept records of the extent to which the temperature each day exceeded the average of 42° . The addition of these figures from the first of the year to the date of the wheat harvest, i.e., the sum of the "day degrees," is regarded as the "vegetative potentiality" of the climate. Over the period of observation this factor was found to be so extremely small that there is only a little margin of climatic power available in Great Britain for the cultivation of wheat, though both it and barley will ripen even in Scotland in normal years. Yet wheat and barley are, properly considered, precarious crops in Great Britain. They are separated from failure by a slight margin even in good years and often are destroyed in certain years or particular districts by excess rain or temperature deficiency. Oats are somewhat more suited to the wetter parts of the country. Maize or Indian corn cannot be ripened at all in any part of Great Britain.

Until the revolution in agricultural technology, which in the nineteenth century brought about a large increase in the yield of

the soil, Great Britain was seriously limited in the amount of food she could produce. Since no very large quantities of foodstuffs could be imported because of the inadequacy of shipping, the population of the land, being dependent upon home production of food, was necessarily restricted to small numbers, either as compared with the population of Great Britain today or as compared with the population of France in earlier times. Even after the great changes in methods of farming in the nineteenth century increased the yield of the soil as compared with the past, Great Britain still could not support, from food grown at home, anything like her present population. Although a larger number is now provided for on the basis of home-grown food than was the case in earlier periods, the present-day figures of the British population would be impossible without the ocean transportation which makes available to British users the food supplies of the rest of the world.

Geographical Divisions and Soils

The eastern parts of England and Scotland, where less than thirty inches of rain fall annually, are more suited to plow farming than the western portion of the island, and in this eastern half much of the land is in arable cultivation. The higher, wetter ground of the western part of the island is given over to pasture for cattle and sheep, and only the valleys and plains of lower rainfall can be used for crop farming.

Geologically speaking, Great Britain is divided roughly into an area of old primary rocks and an area of more recent deposits. The old primary rocks lie north and west of a line drawn from Flamborough Head to Dartmouth. They are mostly granites and schists which have weathered down into infertile soils. It thus happens that the area of greatest rainfall is also the area of the least fertile soils, and a double restriction is thus placed on arable farming in the north and west of Great Britain. The north and west are predominantly given over to grazing. Cattle raising, both for meat and for milk, and sheep grazing are more important than arable farming. In the past this country, with its harder and poorer life, was much less densely settled than the rest of the island.

South and east of the line drawn from Flamborough Head to Dartmouth the land was many times elevated and submerged in

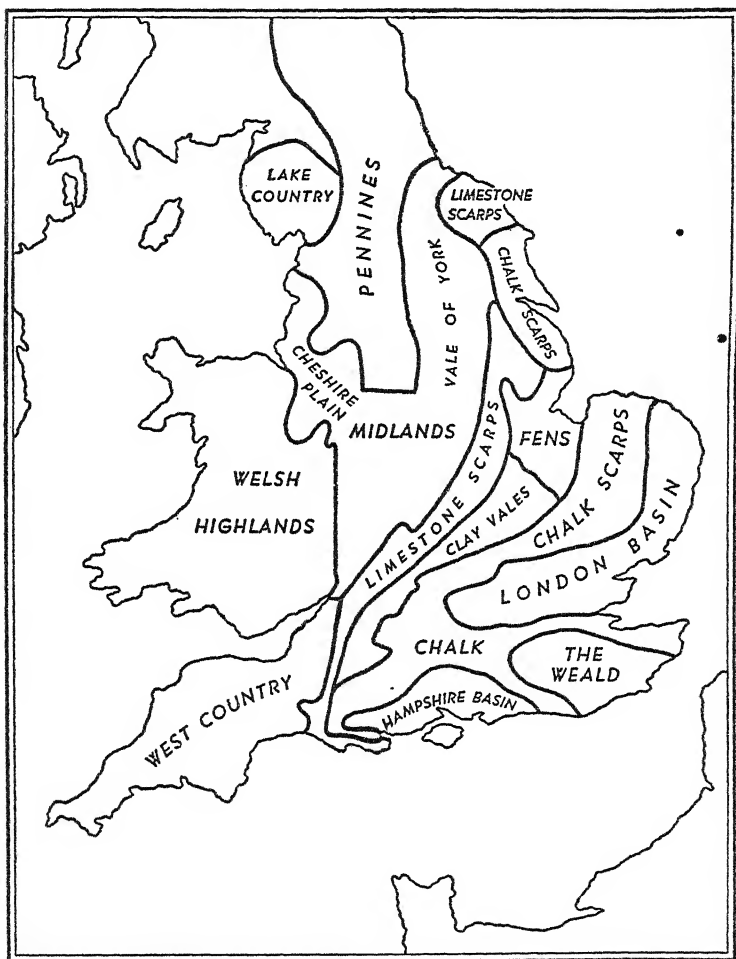
past ages. Over the old primary rocks there were laid down newer, softer rocks, such as red sandstone, limestone, and chalk, which have weathered into fertile soils. It is in this part of England, on the basis of these fertile soils, that down to the eighteenth century the greater part of the English people lived and worked out their destinies.

In traveling over this country from west to east one would meet first the Red Plain of the Midlands, with its extensions to the northward in the Cheshire Plain and to the northeastward in the Vale of York. The rock of which the soil is composed, although called red sandstone, consists in reality of marls and clays with a reddish coloration. Down to the end of the Middle Ages this district was covered with forests, which provided charcoal for the iron furnaces of the time. Since the clearing of the land, the Red Plain has been one of the most important English agricultural areas, and the presence of coal around the lowlands of the Plain makes it also the center of England's industrial life.

The southern and eastern margins of the Midland Plain are formed by a line of limestone uplands known as the Oolitic Ridge, since it is composed of oolitic limestone. This ridge includes the Cotswold Hills in Gloucestershire, Edge Hill in Warwickshire, the Northampton and Leicester Heights, and the Yorkshire Moors. The uplands of these hills are bare and open; the valleys form excellent grazing meadows. East of the Oolitic Ridge lies a broad band of heavy clay vales, terminating at their northern end near the Wash in a vast low-lying area, marshy until the seventeenth century and known as the Fens, and containing some of the most fertile soil in England. Eastward again a series of chalk scarps comprising the Berkshire Downs, the Chiltern Hills, the Lincolnshire—Yorkshire Wolds, the Hampshire Downs, and the North Downs and South Downs of Surrey and Kent, radiating like the sticks of a fan from the region around Salisbury Plain, form the boundaries of the London Basin and the Eastern Plain, the Weald of Sussex, and the Hampshire Basin.

Throughout the region east of the Oolitic Ridge the dry winters and comparatively warm summers suit both wheat and barley. In earlier times heavy clays were favored for wheat cultivation because it was believed that heavy soil was required to give anchorage for the wheat stalk with its weighty ears. The wheat still tends

to seek the heavier soils, the barley the lighter ones, while oats are grown everywhere.



Natural Regions of England and Wales

In Great Britain, in consequence of the more than sufficient rainfall, surface water has been an ancient problem. In prehistoric times the more low-lying clays and loams were soggy and swampy beyond the powers of primitive peoples to drain properly. The chalk hills, taken together with the Hampshire Plain from which

they radiate and the oolitic ridges from which they are separated in the south by but a narrow space, are the only formations of considerable extent in Great Britain at once reasonably fertile and naturally well drained. The dry porous limestones and chalks consequently attracted the first settlers, and it was on this widely extended system of low hills and ridges that the earliest English civilization was developed during the Neolithic period, which extended for two thousand or more years before the beginning of the Christian Era. Many of the chalk hills are grass-covered, but because of the porosity of the soil the herbage is unfit for cattle. Sheep thrive there, however, and from time immemorial it has been a practice to overcome the effects of drought in the spring and to maintain soil fertility by using sheep to manure and tread the land.

The valleys between the chalk hills are covered with layers of sand and clay brought down during the post-glacial floods. The heavy clays were hard to deal with until modern drainage methods were developed and had to be left fallow one year in three. Yet, since this land holds moisture and provides for an abundant vegetation, the more modern villages are found clustered in these valleys.

To the extreme east and southeast, in the basins, wealds, and plains which fringe the North Sea and the English Channel, a great variety of soils presented different problems which led to different social and economic solutions. In the Eastern Plain, for example, the light soils tend to dry out in the spring. The farmers there learned to mitigate spring drought by good cultivation and by the use of barnyard manure. The necessity for barnyard manure led to the winter feeding of cattle and the improvement of stock. Of the two counties in the Eastern Plain, Norfolk tended to produce advanced ideas of agricultural technique; Suffolk to raise some of the finest British cattle.

The Area of the Country and Crop Production

England (including Wales) has a superficial area, not including water, of 37,132,688 acres. At the present time 24,863,114 acres are under crops and grass. The balance of the surface of the country represents city land, residence sites, manufacturing plants, mines, railways and roads, and barren waste.

More emphasis is placed at present on pasture farming and stock raising than upon crop farming. Yet, even in arable farming, so high a degree of technical improvement has been attained that though Britain is relatively poorly adapted to cereal farming, as much as 40 bushels of wheat to the acre are grown in the most fertile sections. For England and Wales the average yield is 32 bushels to the acre (figures for the ten-year period 1926-1935). On the rich prairie soils of the United States 20 bushels an acre is considered a good average. The opinion of the best scholars is that in the Middle Ages British land produced from eight to ten bushels of wheat per acre. The area under cultivation was much smaller than it is now. A large part of the story of English economic history is the account of the expansion of the cultivated area and of the increase in the yield of grain per acre. On those two factors the growth of the population depended to a considerable extent.

Forests and Mines

Agriculture was, of course, not the only source of livelihood even in the earliest period. The forests, the rivers, and the sea were always important. Thus the great woods which covered much of England provided game and in a more advanced economy the acorns and beechnuts which fell to the ground in the oak and beech forests were fed to great herds of swine. Timber for building and wood for fuel were always significant products. The sea is sometimes said to be more productive of food than an equal area of land. The rivers of Great Britain and the waters surrounding the island teem with many kinds of food fishes, and fishing was an important occupation from the earliest periods. Mining and quarrying were also practiced. Thus we know something of the quarrying of flints in Neolithic days and even of a considerable commerce in them. Lead, copper, and even iron deposits were worked in very early periods. Tin mined in Cornwall was sought by the Phoenicians. Indeed, the earliest known description of Britain was written by a Greek who was interested in the British tin trade.

In more recent times the great coal fields and vast iron ore deposits of the island provided the basis upon which Great Britain

became the world's foremost industrial nation. The exploitation of these resources was not seriously begun, however, until the sixteenth century.

Commerce

In the modern world a large proportion of Englishmen live by trade and commerce, buying and selling and transporting the products of all countries to all parts of the world. For this kind of business Great Britain has a most fortunate situation, lying as she does off the west coast of Europe, athwart the sea-lanes which connect the continent with the rest of the world. Great harbors protected in the estuaries of tidal rivers, such as London on the Thames, Bristol on the Severn, Hull on the Humber, Liverpool on the Mersey and Southampton on the Wash, afford facilities for the most convenient dispatch and receipt of goods. During the Middle Ages, however, when the world known to Europeans was limited to Europe, and when her most highly developed civilization bordered the Mediterranean Sea, Great Britain lay on the outer edge of things. At the same time her southern and eastern districts were close enough to Europe to share, by a short cross-channel haul, in the continent's developing economic and social life. While there is no time in which evidences of commerce with Ireland and with Europe are not found, down to the end of the Middle Ages commerce was on a much more restricted scale than in later times. From the earliest periods some Britons made their living in commerce, though the field of operations was restricted to trade with other parts of Great Britain itself or with the adjacent lands of France, the Netherlands, Ireland, and the Scandinavian countries.

Racial Elements

The comparison between the present-day activities of Englishmen and those of the Middle Ages, as instanced in the significance of agriculture, forestry, mining or commerce, gives rise to certain qualifications upon a more fundamental generalization. It is generally held that the soil and climate and the situation of a country determine the most profitable direction which the activities of a people will take at any time. Yet it is at once appar-

ent that the relationship between physical environment and economic development is not an absolute category. It shifts constantly, depending a great deal upon the intelligence and character shown by the people of the land in question. The physical limitations which determine developments along a certain line at one time are altogether altered in another period by the moral fiber, that is to say the awareness, initiative, and enterprise of individuals among the masses of the inhabitants.

It has been a fashion to think of certain racial stocks in Europe as excelling others in such particulars. British writers have yielded to none in their praise of the British character as compared, perhaps, with the Latin. While character still stands as a recognized factor in economic advance, the emphasis upon racial features would seem to have been overdone. Basically western Europe is inhabited by the same component races. The proportions of the different ethnic elements in each country vary, but the slight difference in ratios is probably not of great significance. Like the rest of Europe, Great Britain was settled after the ending of glacial times by perhaps three ethnic stocks. These are the so-called Nordic, Alpine, and Mediterranean races; that is to say, the long-headed folk with blonde coloration, the round-headed peoples with intermediate complexions, and the brunette long-heads. These basic racial elements continue to this day, with little change, to make up the English people. The round-headed Alpines are less numerous in Great Britain than in central Europe. The blonde long-skulled Nordics are more conspicuous in the north and east of Scotland and the east of England. In western Scotland, Wales, Cornwall, and southwestern England, as in Ireland, the dark long-skulled peoples predominate. Nordic, Alpine, and Mediterranean types may be seen on the streets of Britain's great cities at the present time. Yet while the basic racial stocks remain, these have been subjected to the impact of many different cultures. Different ways of doing things and different ways of making a living have been taught to the original peoples by a succession of later invaders, who imposed their civilizations upon the aboriginal inhabitants and gravely altered their social and moral systems.

Since the conquerors were themselves of the same general racial stocks as the people living in Britain, racial features underwent little change. The Celts, the Romans of the ancient empire, the

Germans, the priests and bishops of the Roman Church, the Danes, and the Normans have each in turn been responsible for a series of invasions which introduced new languages and new institutions among the underlying masses. The common people changed masters and manners without losing their essential characteristics of docility and application.

The successive newcomers were equipped with superior tools, skills, and organization, and it was through these that they were able to dominate and raise to their own cultural levels the masses of the existing population. The influence of groups of invaders upon British development can be illustrated by some things we know of the Celts, who came from the continent in a series of migrations beginning about the sixth century before Christ. By the time of Julius Caesar's visits to Britain in 55 and 54 B.C. the most remote of the pre-Celtic inhabitants probably had learned to speak the Celtic language. On the outer fringes of the areas in which the Celts had settled the older ways of living were still but little affected. Here people subsisted in hut-villages and on hut-farms and had hardly any implements except those made of wood and stone. Elsewhere the iron-age culture of the Celts prevailed, with survivals of the Bronze Age which had preceded it.

It is now the more or less accepted opinion that while the general physical features of the people living in England are an inheritance from prehistoric races, as modified by later migrations containing substantially the same racial elements as those already present in Britain, the institutional inheritance derives in larger part from those Germanic invaders who, under the names of Anglo-Saxons, Danes, and Normans, occupied the country in wave after wave of conquest and settlement between the middle of the fifth and the end of the eleventh century. These people were all pre-eminently agriculturalists. The methods of tilling the soil which they brought with them and their organization of the folk for more efficient production constitute the first chapter of the study of English economic history. Yet in this generalization it must not be overlooked that in certain parts of England, especially to the north and west, many Celtic features survived in the layout of the villages and fields. In these regions Celtic institutional survivals of this sort indicate that the Celts continued to be the predominant elements among the population and that the Germanic settlers were few.

The Population of Great Britain

Great Britain has today a population of 45,000,000 people. Of this number 40,000,000 live in England and Wales (37,789,738 live in England, 2,592,014 in Wales), and 5,000,000 in Scotland. If England alone were taken, and the population evenly distributed over the country, each of the 50,674 square miles of her area would have 738 persons. This figure, which is known as the mean density of population, is quite high. Yet it is only comparatively recently that England has attained to anything like her present numbers. During the eighteenth century the rate of increase was almost suddenly accelerated, and in two hundred years the population increased from five and one-half to the present forty millions. During the last quarter of the nineteenth century the rate of increase began to slow down, and during the past decades the increase has been comparatively small.

In 1801 the first decennial census was taken. For the hundred years before that date there are available very good calculations and estimates of the number of the people, based on careful studies of the number of births, marriages, and deaths as recorded in the parish registers preserved in the churches. But before the year 1700 the figures are much more uncertain, and apply to only a few years in the long stretch of centuries.

During the days of the Roman occupation, on the basis of the study of the areas of the Roman towns and the number of houses in them and the number of known villas and villages, it has been estimated that the more or less Romanized inhabitants of Britain numbered half a million. To this number another half million is added to account for the un-Romanized population. A total of a round million is thus suggested for the Roman period.

The first definite population figures date six centuries after the end of the Roman occupation. In 1086 William the Conqueror, the first Norman king, ordered a general inquisition, for fiscal purposes, to find how much land each man in England had and how much it was worth. The survey, known as *Domesday Book*, did not cover all of England, omitting London and other towns and some of the northern counties. *Domesday Book* lists 283,000 heads of families. Allowing for an average of five persons to a family, and making an allowance for the omitted counties, we

have a population figure of about 1,500,000 persons for the year 1086. Of these only 40,000 can be designated with any certainty as townsmen. Perhaps 9 per cent of the rest of the people lived in hamlets of from two to five households; from 16 to 35 per cent lived in small villages of from 6 to 11 households, and from 57 to 73 per cent lived in larger villages of over 12 households.

The next figures, for the years 1327 and 1332, are based on inferences drawn from certain tax accounts, known as subsidy rolls, for these years. England may have had 2,225,000 people at this time. There seem to have been more large villages of two or three hundred people than in 1086, and boroughs were becoming numerous.

In 1377 and 1381, poll taxes were levied on all adults over fourteen. Outside of Chester and Durham, which were omitted, the number of persons taxed was 1,355,000. Making allowances for the individuals who "escaped" the tax and for the counties where the levies were not collected, and adding in one-third for the children under fourteen, we obtain a figure of about 2,400,000 inhabitants in 1377-1381.

For the end of the sixteenth century two figures are available. These indicate a population of 3,882,000 in the year 1570 and 4,460,000 in 1600. A century later, in 1696, a careful estimate gave a figure of five and a half million persons living in England. So slow did the increase seem to Gregory King, one of the economists who arrived at this number, that he calculated that the population of England would reach 11,000,000 only in the year 2300, and 22,000,000 in the year 3600. As a matter of fact, because of an acceleration in the rate of increase which King had not conceived of, the figure of 11,000,000 was reached before 1821, and the 22,000,000 mark was passed before 1871. The constantly growing numbers of the population are in themselves an important factor in economic history. They represent the results of changes which have already taken place, and they led to further changes in the future. Fifty people living on a square mile of land have quite different problems from five hundred people occupying the same area. Their readjustments to their new conditions express themselves in terms of institutional changes in economic as well as in political and social life. The social and political aspects of such a development are well known; the economic phases are treated in the following chapters.

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Chapter 2

ANGLO-SAXON ENGLAND

It CANNOT be emphasized too frequently that until comparatively recently, that is, down to the middle of the eighteenth century, England was pre-eminently an agricultural country. In her earlier history her people were almost exclusively engaged in farming. Commerce and industry occupied a very minor place, and, indeed, those who took part in the business of exchange or of manufacture frequently spent much of their time in cultivating the fields. The economic history of England, in the most important aspects, is then, for centuries, the story of the development of English farming and of the processing or manufacture in the home and in the village which accompanied it.

After the highly important transition from stone-age civilization to iron-age culture, accomplished by the Celts in the course of their settlement of the island of Great Britain during the five or six hundred years before the time of Christ, the most promising start toward the next advance was provided by the coming of the Belgae, a Celtic tribe which crossed to Britain from the continent during the first pre-Christian century. The Belgae, establishing themselves particularly in what is now Kent, Essex, and Hertfordshire, avoided the chalk and limestone ridges with their light, porous soils and occupied the rich loams still heavily covered with timber. The trees they felled with thin iron axes, and the heavy soil they broke with heavy animal-drawn plows, provided with a colter or knife to cut the sward and designed to turn the sod. Their Gaulish plows were the first known in Britain that were capable of doing more than scratching a furrow. With axes and plows and a knowledge of the value of the forest-covered loams, the Belgae began to clear the land of woods and to open to settlement the richer lands hitherto unoccupied. As they reaped bountiful crops from the virgin soil, they extended their

settlements, pushing forward towards the north and northwest. They built isolated farmhouses, stocked their farms with cattle, and built villages in the valley sites, especially at the river crossings. Their pottery, thrown or shaped on the wheel, was technically superior to anything previously made in Britain. Their business relations developed so rapidly that they found coined money necessary. The first of this they brought over from Gaul but presently began to mint it themselves. The Belgic settlers soon became wealthy enough as the result of the productivity of their farms to buy considerable quantities of wine, Arretine pottery, Campanian metalwork of bronze and silver, and other luxury wares from the Romans, paying for them with wheat, cattle, hunting dogs, hides, slaves, and iron, gold, and silver. Their greatest contribution, however, was the beginning of the cultivation of the rich forest land. They showed the possibilities of the valleyward and forestward shift of the population, but they did but little toward its actual realization. Perhaps this was because they were conquered by the Romans, under whose sway progress was forced to conform to the exigencies of the imperial system.

The Roman Heritage

The Romans began a systematic military conquest of Great Britain in 43 A.D. and maintained political ascendancy in the island until the turn of the fifth century. The Romans cut their great military roads in all directions through the country, opening up the most inaccessible regions to future colonization and settlement. They introduced, moreover, the town as a center of civilization and of corporate life. Yet the value of the Roman town for the future must not be stressed too much, in view of the fact that during the third century town life decayed very rapidly. Long before the Romans departed, the Roman-British towns were squalid, sparsely settled slums, rather than centers of elegance and culture, and there is almost no evidence that any Roman town maintained a continuous organized existence into the Anglo-Saxon period.

During the Roman occupation of Britain, the land raised and exported large quantities of wheat, together with cattle, iron, hides, slaves, and hunting dogs. In exchange for wheat exports the British took the various goods and luxury articles, such as

pottery, metal wares and enamels, and oil and wine produced in Italy, Gaul, Spain, and the Rhineland. So important was British wheat for the Roman Empire that Britain was spoken of as the granary of Rome. On the other hand, both before the beginning and after the end of the Roman period, farming in Britain seems to have been conducted on a subsistence basis. That is to say, each farming community not only produced nearly all that it required for its life but consumed its production on the spot. Little was sent away from the place where it was raised; little was imported; and little, except seed for the next sowing, was carried over as a surplus.

At first glance it would seem that a country practicing agriculture along such lines had little possibility of development. Yet within the self-contained communities marked changes did take place. The mutations tended, moreover, during the different centuries to have certain similarities over a wide area, as though they followed common styles and patterns. Rationalization about what these styles and patterns actually were provides at least a clue to the economic history of early periods.

In the time of the Roman occupation of Britain, and perhaps even earlier, two types of agricultural community were found in the island. Of these the first was the Celtic village. This was a group of huts, generally round, one-roomed structures, clustered together within some kind of ditch or fence which formed a defense against the wolves. In Roman days the majority of the people of the island lived in villages of this kind. The farm land surrounding the villages was divided into small fields, approximately square or rectangular in shape, worked by the individual villagers, subject to periodic reassignment by action of the village community. The Celts assigned to every villager at the regular distributions a share of every kind of soil, good or bad, in the village. Thus the individual farmer came to hold scattered parcels of ground, without any great symmetry in their arrangement. This Celtic system was known as *runrig*. The Celts did not practice a regular system of crop rotation and fallow but successively improved different sections of their land. After an area had been farmed for a number of years it was allowed to revert to waste, and the next section was plowed up. Sometimes a small plot known as *infield* would be intensively fertilized and cultivated; in

the outfields successive areas would be plowed up for terms of years and then allowed to revert to fallow.

The Celts plowed their fields with the *aratum*, the light wheel-less plow, which did little more than scratch the surface. There is evidence for thinking that these villages did not all remain "free" but became parts of imperial estates or of the possessions of wealthy men. The villagers themselves during the Roman period often became *coloni*, that is, tenants who could not leave the land.

The second type of agricultural unit was the villa. This was an isolated house, with its outbuildings for the servants, animals, and equipment, surrounded by the broad fields, forests, mines, and other units of production which formed the estate. The villa was the enterprise of an individual farmer, working his lands through laborers or slaves. Agricultural practices and techniques, however, seem to have remained British without much in the way of improvements introduced by the Romans.

It seems that in the days of Roman occupation there was a considerable extension of the amount of land under cultivation as compared with the earlier Celtic period. The expansion of settlement was encouraged by the steady market for farm products provided by the Roman towns on the continent and by the Roman troops in the island. It is likewise pretty evident that although the Belgic settlers had suggested the possibility of opening up the heavier soils, most of the new farms, whether they took the form of villas or of Celtic villages, were carved out on the naturally drained oolitic, chalk, and gravel soils where the Celts were already settled. There is no evidence that even the most advanced villas ever drained their land. Only in the reclamation and settlement of the land in the Fens did the Romans depend on drainage works.

The basic crop both in the villages and on the villa farms was wheat. Horses, cattle, sheep, pigs, and geese were the common livestock. Both villas and villages could provide for nearly all their own needs—bread, meat, milk, cheese, beer, wool for clothing, leather, wood for fuel, building and furniture-making, and tallow for candles. Only iron and other metals, pottery, mill-stones, and salt would have to be brought in from the outside world, since the production of these articles is localized by the way that deposits of their raw materials are found.

Roman Roads and Trade

During the Roman period Britain was supplied with a network of roads, of which about five thousand miles are known. The great imperial highways, 20 to 24 feet wide, metaled with gravel, radiated from London in various directions and were designed to provide the shortest and straightest lines of travel between London and the legionary fortresses and the tribal capitals. For local traffic there were less solidly built secondary roads which still were passable throughout the entire year. On the roads the chief vehicle was the four-wheeled Celtic cart, whether the business in hand was military transport or the hauling of a load of grain by some farmer. These roads were supplemented by a good deal of water-borne traffic on the Thames, Trent, and other rivers, where 40- to 50-foot dug-out canoes were common. There was, too, a good deal of cross-channel traffic, centered in the tidal basins of the Thames, Southampton Water, and the Humber.

While a large part of all road and water-borne traffic in Roman times was connected with the needs of the army, the tax-gatherer, and the government, there was a lively movement of transport in the ordinary way of business. Behind this carriage of materials and the coming and going of business folk there was a certain turnover of minerals and manufactured goods in addition to the trade in agricultural products which represented the chief activity of the province.

Internal trade was conducted at first in the fora of the towns, and as they decayed their places were taken in the third and fourth centuries by local markets in the country. Much retail trade was carried on by hawkers and peddlers who carried charcoal and salt, pottery and brooches, iron saucepans and glass from house to house and from village to village. The cattle, wheat, and cloth which the villa produced beyond its own needs were sold at the markets.

At the beginning of the Roman occupation the Roman trader, following in the wake of the legions, taught the Celtic upper classes the use of Roman luxury wares such as pottery, metal wares, Italian wine, and Spanish fishsauce and olive oil. Native workmen soon learned to make certain of the new articles tolerably well, and in the third and fourth centuries Britain was so

nearly able to supply her own needs that foreign importations were reduced to a small volume. What foreign trade there was in the last Roman period seems to have been carried on in connection with the business of the legions and the tax collector. When they were withdrawn, foreign commerce ceased.

A great many of the articles needed in everyday life were made in the household. Yet even so, commercial manufacture had developed to a certain extent, particularly in the making of pottery ware, bricks and tile, woolen cloth, and iron and metal wares. This kind of production seems to have died out in the Saxon age. Perhaps the same thing is true of the mining of minerals, which, next to agriculture, formed the most important source of wealth in the Roman period. Lead, silver, iron, tin, and copper were at that time extensively mined, and coal was valued for its utility both in smelting ores and in domestic heating.

The Anglo-Saxon Invasion

At the turn of the fifth century the political connection between Britain and Rome was ended. By the middle of the fifth century—the traditional date is 449 A.D.—the invasion of the Anglo-Saxons had begun, and by 600 A.D. these Germanic tribes had occupied the eastern, central, and southern parts of the island.

Air photography in certain parts of England has led to interesting suggestions regarding the development which took place in English agriculture on the chalk hills of Wessex and Sussex after the end of the Roman occupation. Air photographs show the contrast between the upland Celtic villages with their rectangular fields and the riverside settlements of the Anglo-Saxons with their great open fields cultivated in acre and half-acre strips. From this and other kinds of evidence it seems likely that when the Germans came they did not occupy the Celtic villages. Indeed the Celtic villages persisted until the very inefficiency of their way of living in comparison with the new German settlements led to their abandonment by their inhabitants. Nor did the Germans occupy the Romanized villas or their sites. Many villas were abandoned by their owners in the last days of the Roman period. Others were cultivated long after the Germans came. But scarcely any excavated villa in England shows evidence of having been occupied by the Anglo-Saxons.

The Anglo-Saxon conquerors brought with them from Germany a heavy plow capable of turning a furrow and a familiarity with the cultivation of heavier, wet soils. They did not veer off from the more fertile lands of the valleys as the Celts had done, but took up the occupation of the richer clays and loams and of the land covered with forest. Thus they continued the process long since initiated but not carried very far by the Belgic settlers of Caesar's day. Under Roman influence the Celtic inhabitants had exploited more completely those soils which they knew how to cultivate. The German invaders moved into lands and areas hitherto not taken up. The occupation of the heavy clays and loams took place between 650 and 1050 A.D. and is regarded by some scholars as "the greatest change that Britain has undergone since first it began to be inhabited." In competition with the better farming of the richer soils the more backward Celtic civilization eventually was displaced.

This generalization must not be oversimplified. It is perfectly clear that in areas such as Wessex the Saxon settlements were made in the valleys at the sides of the rivers, and that here the hill-top farms of the Celts presently returned to pasture and waste. Yet in certain other regions, such as the gravel terraces of Thames valley and the Midlands, which were the scene of some of the earliest German settlements, there was less contrast between the older and the newer villages.

Perhaps the invaders were as yet not so culturally advanced as were those who came later to Wessex. They had less superiority in plows, tools, and technology. They perhaps even learned something from the folk among whom they settled, and the economic efficiency of the newcomers was not so markedly superior as to lead to the disappearance of the older economy. In such regions the old and the new civilizations possibly mingled. Among the Celts there had been for centuries some nibbling at the forest land; the earliest Saxons showed a decided preference for the lighter and more easily worked soils. The type of economic life which developed owed more to the past than was the case in the settlements made later. In Kent, for example, where the Belgae with their heavy plows turned to the richer soils even before the Roman conquest, the characteristic Saxon village never developed at all. When even the most generous allowance is made for pre-Saxon influences on later English agriculture, it still seems that

there was a decided break in the continuity of social, political, and economic life when the Saxons came. The Roman towns and villas disappeared, and the Celtic villages on the hillsides were abandoned as the Saxon invaders and settlers occupied the land in the richer valleys and forests.

The Anglo-Saxon Settlements

There were differences among the German invaders in regard to their levels of culture and technical equipment at the time they left their home lands. Their methods of settlement and conquest varied. The topography of the country, the number of the Celts who survived, and the extent to which pre-Saxon farming practices were adopted by the Germanic settlers were other factors which led to decided differences in the nature of the economic institutions which were established in the different parts of England.

The standard Germanic settlement was a nucleated village surrounded by agricultural land. The continental traditions of the Saxons involved the division of the land into small strips, a furrow long (660 feet) and four rods (66 feet) wide, roughly an acre in area. These were allotted to the inhabitants of the village so that each had some of the best and some of the poorest land. In the earliest days a family might have 120 acres of land scattered about in acre strips. Clusters of such strips made up the yardlands. The yardlands in turn were grouped into two or three fields, which were cultivated according to a system of crop rotation and fallow.

The supposition is that one of the factors leading to these arrangements was the small number of plows and of farm animals available in a new settlement, so that communal plowing was necessary. One villager furnished the plow, other villagers put in their oxen to make up the plow team. When the settlement was first laid out, an acre was plowed for each family all around, and then another acre in rotation until each family was provided with enough land for its sustenance. The strips represented the amount of land that could be plowed in a day.

In some cases their length and width were determined less by a traditional measure than by the contours of the English fields. The yardlands, according to this interpretation, were blocks of

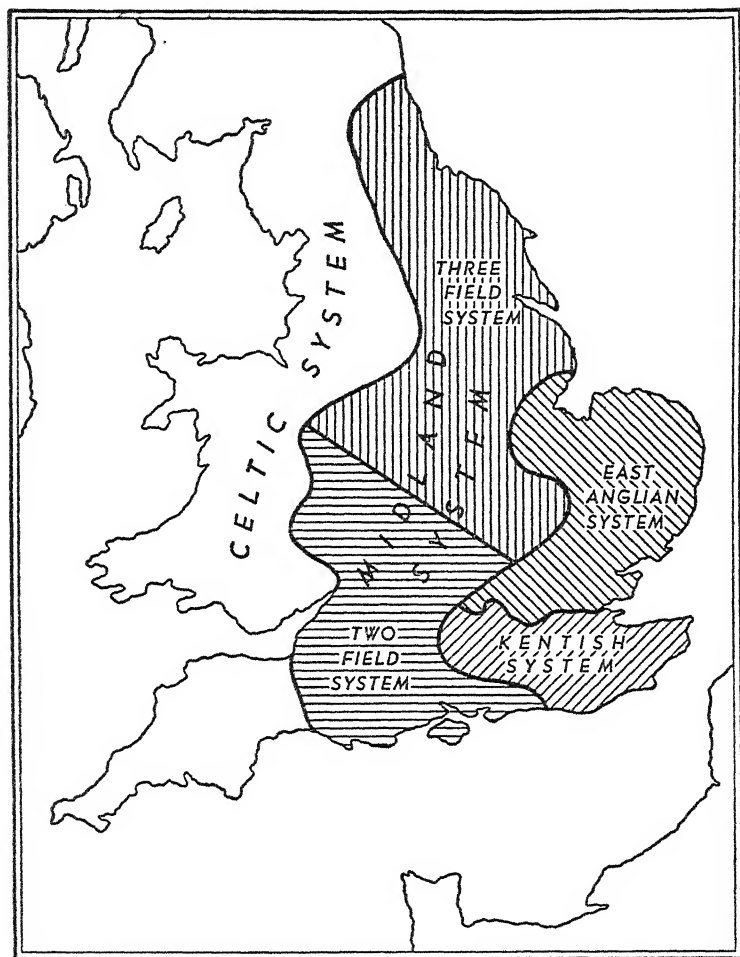
strips all lying in the same direction and were formed as a result of the necessity of running the furrows to conform to the contour of the land to provide drainage. Where the slope of the land changed the furrows would be plowed at a different angle, and another yardland would be formed.

In each yardland the strips were held by many different occupiers. Each individual's holding consisted of many strips scattered over the village fields. The methods of cultivation and the crops to be sown were controlled communally, though every villager cultivated his own strips. All farmed according to the same technique, observed the same regulations for the use of pasture and woods, and followed the same rotation of crops. The farm land of the village was divided into two or sometimes three great fields. One field was allowed to lie fallow each year. Where there were two fields part of the second field was sown in the spring and part in the fall. In the three-field villages the second field was allotted to spring planting and the third to autumn sowing. In the field planted in the spring different things, such as beans, peas, or oats, might be planted on the several strips, but they had to be of such a nature that they could be planted and harvested at about the same time. This requirement was based on the fact that on a certain date the field as a whole was opened to grazing by the animals of the village. There was less leeway in the case of the fields which were to lie fallow and those which were planted in the fall. Wheat or rye was the regular crop for autumn sowing, and since the farm stock grazed over the fallow, all strips in the field which were designated as fallow had to be left unplanted.

Necessary elements in the village economy were the meadow and the waste or common. Meadow land was restricted in amount in England. In consequence the supply of hay was limited and was reserved for the winter feeding of stock. During much of the year the village cattle were fed on the natural pasture which formed part of every village. This pasture together with the woods constituted the waste, in the use of which all the villagers shared. From it they derived timber, fuel, and small game as well as pasture for their cattle.

The Saxon village was the type of economic unit that was formed in all that part of England which lay south of a line from the Severn to the Wash, except in Kent, East Anglia, the lower

Thames basin, and the Cornish peninsula. In the extreme south-west, Cornwall and Devon remained regions of Celtic hamlets,



English Field Systems

and Germanic practices were not adopted. Kent, the county of the first Germanic settlements, had special characteristics of topography; and these, with the peculiar technological experiences and equipment of the settlers, served to prevent the development of the two- or three-field village there. In East Anglia the two- or

three-field villages were absent also. Here compact farms like those of Kent seem to have been the normal thing in the earliest period. The best fertilizer for the light sandy soils of this region was provided by folding sheep regularly on the land as it lay fallow. As each farmer sought to keep the foldage of his own sheep for his own land, there was a tendency to keep holdings together so that the sheep could be fenced in on them with wattle fences. Later some subdivision of the compact several farms occurred, and through the acquisition of parcels in separate fields by individual occupiers, a certain amount of scattering of parcels of single holdings took place. But these scattered parcels were not evenly divided among the different fields of the village. The creation of manors in the period of the Danish invasions of the ninth century seems to have checked the process of subdivision at an early date. The result was that in East Anglia there was a land system originally like that prevailing in Kent which had certain superficial resemblances to the Saxon two- or three-field arrangements. In the lower Thames basin, including the counties of Surrey, Hertford, Middlesex, and Essex, the Kentish, the Saxon, and the East Anglian examples exercised certain influences upon agricultural practices.

Even in the country where the two- or three-field cultivation of the Saxons was dominant, it did not monopolize the field. Thus in Shropshire and Herefordshire in the west there long remained many hamlets and isolated farms of the Celtic pattern. Nucleated villages of the Teutonic type were uncommon here.

Outside the southeastern area the Saxon village was either subject to many modifications through contact with the Celts or was never introduced. Thus in Northumberland, which was "a county of villages rather than one of hamlets," many non-Teutonic features were found. It is believed that this northern area was the scene of a military conquest. Nucleated Teutonic villages grew up around the residences of the Anglian conquerors, but many of the details of agricultural methods, such as the use of the Celtic plowland as the unit of organization, were taken over from the conquered Celts. In Wales and in the northwest it seems that Celtic arrangements continued without serious modification by the Saxon conqueror or settler.

The most important matter in England's economic develop-

question of the local variations in agricultural methods and practices which were established in the different parts of England, but the fact that in large parts of the island the stagnant or, at best, the static culture of the Celts was superseded by the more advanced technology of the Saxons. By 1050 the face of the country was transformed. The people lived in the valleys rather than on the uplands. The clearance of the forests and the cultivation of the wetter and heavier land in place of the lighter upland soils made possible the production of much heavier crops. Increased production provided the possibilities for both a larger population and a richer civilization.

Retrogressive Features

Yet the advances made between the fifth and eleventh centuries were not without their retrogressive features. The Roman roads fell into decay and disuse. Town life almost ceased for centuries. True, its vitality had already been sapped during the days of the Roman occupation, and such towns as continued to exist during the fifth century were but shadows of their former selves. Yet they did preserve and continue a way of living which offered certain possibilities for the development of character and manners which life in the country lacked. The disappearance of such towns as still remained at the end of the Roman period seems to have been almost complete. Perhaps a few squatters continued to hover around the former greatness of London, and at Canterbury the Jutish king pitched his tents in the midst of the abandoned houses and buildings. Yet the town as a corporate social organism disappeared, and it was centuries before the Germans with their habits of country living resumed that phase of the development of civilization which is implied in and made possible by city life.

On the surface of things the decay of commerce, manufacturing, and mining mark a high degree of retrogression. Yet this must not be overemphasized because even in the Roman period there seems to have been little comparison between the importance of agriculture and the other arts. That these ceased in the Saxon age does not necessarily imply an impoverished civilization, since the increase in wealth derived from agriculture in

sated for the losses in other fields of human activity. All that can be said is that though life was no poorer it was less richly provided with gadgets.

Later Saxon Life

Something has now been told of the general phases of the economic developments following the end of the Roman period and the coming of the Anglo-Saxons. At the end of the period of Saxon settlement England presented a varied picture of different kinds of agricultural units, procedures, and methods. In Kent there prevailed the farm cultivated as a great single field by its owner who lived in a tiny hamlet. Self-sufficiency was attained by his owning a tract in the forest and a piece of pasture land in the marsh meadows, both often at a distance from his farm. In Wessex and Mercia the settlements were larger, taking the form of villages surrounded by the village land. The arable land was divided into two or three fields, and the crops to be planted were regulated by the village community. Each field was divided into bundles of "acre" strips, in which each villager's holding was so intermingled with his neighbors' that all had some of the good and some of the poor land. Each villager had certain rights, moreover, in the village woods, meadow and waste which provided him with those necessities which the plowed fields did not produce. In the Celtic parts, not settled by the Saxons, as in the southwest and northwest, the Celtic hamlet prevailed, with farming methods based on Celtic practices.

It seems that a great many of the Saxon farmers were free cultivators in the beginning, owing no man anything beyond certain payments to the king. These were the *gafol*, in one case a rent of one or two pence upon a double hide (240 acres), and the *ferm*, a fixed amount of meat, grain, and other supplies for the king or his officers. During the seventh or eighth centuries the king began to grant these dues to certain noblemen, possibly in return for military assistance; and presently the possession by a nobleman of the right to collect the *gafol* and the *ferm* was twisted into some kind of control over the farmers themselves. Those who had previously been free were now considered as dependents of their lords. Other men without land obtained farms by entering into agreements with a landowner to pay *gafol* in the form of

work during seedtime and harvest on the landlord's own fields. If the lord provided the homestead and stock as well as the land, the farmers agreed to work three or more days a week for him, in addition to seedtime and harvest labor. Over such tenants the lord's control was greater than over others. For a long time such dependents did not lose their freedom in the eyes of the law, but legal fact eventually caught up with economic realities, and men whose ancestors were completely free were recognized as having fallen into a dependent status. Unfortunately little in the way of detail can be added. For centuries a lack of information clouds the scene, and it is not until the middle of the eleventh century that it is possible to survey the economic life of England and to describe the situation as it had developed. The facts for this survey are provided chiefly by the great fiscal census known as *Domesday Book*, made in 1086, which gives reports for the years 1066 and 1086.

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Chapter 3

ENGLAND AT THE TIME OF DOMESDAY BOOK

WHEN the Domesday census of England was made, in the year 1086, English life was still rural and agricultural. Cities were few in number, small in size. The whole urban population as listed in *Domesday Book*, which did not include London and certain other towns, did not number more than 40,000 persons out of the million and a half people who lived in England in 1086.

Domesday Book reveals an England in which the castle, the monastery, and the cathedral dominated the social scene. Knights, monks, and bishops were busy in providing the technical direction for the conduct of agricultural life, and they were engaged in the process of diverting the social surplus to their own control. The technical improvements effected by them produced larger surpluses than had been usual in the past. They also developed several methods of mobilizing the social surplus, that is, of bringing it together into their own hands in such volume that it could be used in some noteworthy way, instead of permitting each producer to consume his increased yield in the form of a bit more bread, or a featherbed, or a little fire to warm himself in cold weather.

Bishop, monk, and noble worked along several lines, but they came out in the end at the same place. Their efforts resulted in overlaying the existing social organization of the villages with a new type of economic unit known as the manor.

The Manor

In the earlier days of the Anglo-Saxon period the social units had been the villages and hamlets. These remained; manors

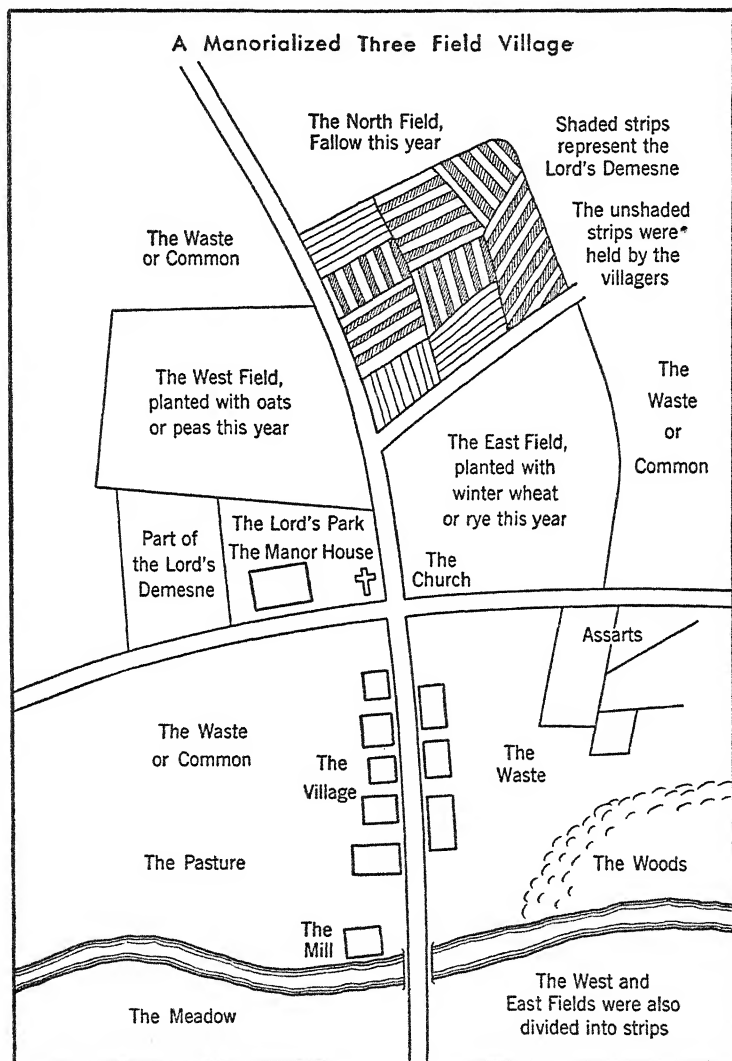
were superimposed upon them. The full development of manor life seems to be the work of a very long period of time. The Anglo-Saxon period witnessed the beginning of the process. The point of departure seems to be the fact that in the Anglo-Saxon villages equality was never realized. There were always some richer men, some poorer men, and even some entirely landless men and slaves. From early days the kings had established royal rights to gafol or rent from the land-holders. In times of stress, such as came with the Danish invasion of the ninth century, royal rights were turned over to the larger landowners, who undertook to defend their districts. In their hands the right to gafol seems often to have been twisted into some right of control over the land on which the rent was paid and over the occupier who paid it. Thus before the coming of the Normans there was a beginning of the creation of rights over the soil and over the people of the villages which were later found in the manorial system.

The coming of the Normans was accompanied by a rapid development. The stage reached in 1086 is revealed in *Domesday Book*. According to the returns here given, the manor might be coterminous with a village; it might be an estate covering part of a vill; and it might include a number of villages. Small manors might contain as few as 15 acres. The manor of Farnham, including many villages, comprised 25,000 acres.

✓ Manors were units of social and economic organization. Their first characteristic was that they were the tenements or holdings of one lord, or of joint heirs, or of a corporation like the canons of a cathedral, managed as a unit. Such unified administration was favored by the king because it made the collection of the national tax or geld easier. In the second place there was usually connected with the manor a large house or residence, often called the manor house. Then again, each manor had a certain area in the proprietor's own occupation, known as the *demesne*, which was cultivated for him by the other inhabitants of the estate. The *demesne* is perhaps the most essential element in the constitution of the manor. Without it a holding could not be considered a manor. It was the land not occupied by the irremovable humbler folk, which under proper cultivation could be made to yield large returns for the proprietor.

Not all villages in England were organized according to the

characteristic manorial set-up, with demesne, villen holdings, and forced labor services. Even in districts where the normal manor



was most in evidence it covered only 60 per cent of the territory. The rest was taken up by villages consisting only of demesne or by those which contained only free tenants paying rent to the

lord. Where it is possible to get at anything like good statistical data, freeholds covered as much as 30 per cent of the territory investigated. ✓

The Lords of the Manor

Who were the proprietors or lords of the manor? First and foremost among them was King William himself. *Domesday Book* shows that over 15 per cent of the cultivated land of England was in his possession, either through inheritance from Edward the Confessor or through escheat to him on account of the rebellion of the former owners. One chronicle speaks of William as having 1422 manors in his own hand. According to *Domesday Book* the king possessed in 1086, 1,182,410 acres (land cultivated by 9686¾ teams) out of 8,472,720 acres (land cultivated by 70,606 teams) listed in the survey. His rents from these holdings were £13,577 a year.

Next to the king as landlords come the great churchmen, such as archbishops, bishops, and abbots, and the ecclesiastical corporations, such as the monasteries and cathedral chapters. According to one calculation, which omits Yorkshire, Cheshire and Suffolk, where it is said that the figures are so complicated that a calculation is impossible, the possessions of churchmen and ecclesiastical corporations amounted to approximately 2,193,000 acres and represented 26½ per cent of the cultivated land in 1086. Since the ecclesiastical holdings were unequally scattered over the country, in certain counties, such as Kent and Worcestershire, more than half of the cultivated land belonged to ecclesiastical owners. In the Danish counties of Leicestershire, Derby, Nottingham, and Lincoln, the figure was less than 11¼ per cent. The uneven distribution of church land among the counties is explained by such factors as the greater generosity to the church by certain of the Saxon kings, particularly those of the house of Wessex, and by the losses suffered by the church during the Danish wars in Lincolnshire and the other Danish shires.

In certain cases the lands credited to a bishop included the land of the monastery attached to his cathedral. The estates of the monasteries were almost equal in total extent to those held by the bishops, but no single monastery held as much land as some of the greater bishops. The Abbey of Glastonbury, the richest

monastery, employed $68\frac{1}{2}$ teams each cultivating 120 acres as compared with $163\frac{1}{4}$ teams employed by the Archbishop of Canterbury. Land was often given or bequeathed to monasteries for the good of the donor's soul, or it might be given as an endowment for a son or daughter entering the establishment.

Among the largest land-holders must be named the two half-brothers of William the Conqueror, Odo, Bishop of Bayeux, and Robert, Count of Mortain. Each had estates in twenty counties. Bishop Odo is said to have held five hundred manors employing $198\frac{7}{4}$ teams, and Count Robert had somewhat more. Many of William's personal friends were given grants of considerable extent, consisting often of the entire estates of Saxon lords who had resisted the conquest. Below them were hundreds of others, ranging down to the simple knight, who might have received only a minor manor or two. Occasionally a Saxon was allowed to retain his land after the conquest, but it is said that not 1 per cent of the land remained under the same holders in 1086 as those who had held it in 1066. Often such survivors held very small properties.

It is at once apparent that those who "owned" or held the land of England under William the Conqueror—the bishops, abbots, corporations, great lay lords, and simple knights—all had many duties in church, state, and the army which prevented them from doing any work on the land themselves, or even from concerning themselves personally with its management. They wanted the land to provide them with a living; and if this were to be done to best advantage, the land would have to be cultivated by others. In modern times an "owner" under these circumstances would hire superintendents, managers, and laborers to work the land for him, or he would rent out his farms on shares or for a money rent. For various reasons these courses could not be followed in the eleventh century. There were not enough laborers available for hire; money was scarcely in use; the owner wanted wheat, ale, wool, with which to clothe and feed himself, his family, officers, servants, and followers. More than that, the land which a bishop or a lord "owned" was not a bare farm such as an early settler might have found on the American prairie. It was already divided into villages, given over to an ancient course of cultivation, and farmed by hundreds of people who had ancient rights which even a Norman "owner" could not disregard. Only a fractional

part of the land in any village, that was formerly farmed by the Saxon magnates and known by the Normans as the demesne, was not actually in the occupation of the old inhabitants.

The Underlying Population

Who were these humble folk, who were everywhere actually cultivating the greater part of the fields and who formed the population of the villages in 1086? Domesday Book recognized among them at least five classes, *villani* or villeins, *cotarii* or cottagers, *servi* or slaves, *liberi homines* or freemen, and *sochemanni* or sokemen. These constituted what the English call the laboring classes, the product of a long development from the days of the Anglo-Saxon settlement onward.

Freemen

According to the findings of the Domesday commissioners, in 1066, "on the day Edward the Confessor was alive and dead," there were in England many free villages inhabited by freemen (*liberi homines*) who owned no superior but the king to whom they paid certain small rents or taxes. They could do as they pleased with their land, which they held by old custom going back to the first Germanic settlements, and were subject to no external authority. They arranged the cultivation of the fields according to a common procedure by common agreement pretty much as the cultivation of the vills which were manors or parts of manors was regulated. But there were in these free villages no lord, no "big house," no demesne, and no forced labor or animal services for the lord or his demesne. These free villages were found, according to the Domesday evidence, especially in Cambridgeshire, Hampshire, the Isle of Wight, Suffolk, and the south-eastern counties of Sussex and Kent. In Suffolk at least 3000 freemen are named as having held land in the county in 1066. In Cambridgeshire 15 per cent of the area of the county was in the hands of freemen. Some of these free villages were "granted" by William the Conqueror to his Norman followers, but such grant merely transferred to the person who received it the right to collect the rents or taxes formerly due from the free proprietors to the king. The grant did not create a demesne for the

lord to whom the patent was issued, nor did it give him the right to such labor dues and animal services as were due him in villages which were organized as manors. The rents were sometimes increased, but in certain instances, particularly in Lincolnshire and in Yorkshire, the freemen seem to have retained their position and privileges intact without any increases of dues or payments.

On the other hand, in many cases the freemen spoken of in 1066 are no longer mentioned in the evidence for the year 1086. In Sussex there were 219 freeholders in 1066 and none in 1086. Here the freeholders lost their privileged position and became villeins. Yet even in the villages which were not free at the time of the Norman Conquest and were thoroughly manorialized then or later, all through the medieval period there continued to be freemen who held their land free of regular manorial obligations. They paid a small rent to the Norman manorial lord, but their social position and their land tenure never lost certain characteristic features derived from the earliest days of Anglo-Saxon freedom.

The Unfree

The sokemen were not so well off as the freemen. They did not own their land and were not free to do with it as they pleased or to withdraw from their lords without permission, for they owed to their lords certain services for their lands, such as plowing and threshing at the proper seasons. They might be required to carry the crops from the fields to the lord's barn and to make certain payments in produce to him. Yet in Saxon times they stood rather close to the freemen. After the Conquest some sokemen were reduced to villeinage. In addition to their former dues the lords were now exacting regularly a certain number of days' work each week.

The central feature of the manor was the demesne and the chief element in manorial economy was the labor provided on the lord's demesne by the villeins, cottars, and slaves. In a general way the number of slaves seems to have diminished in the generation before 1086. Perhaps this was due to the discovery by the lords that the maintenance of slaves by the lord was a more expensive way of getting work done than reliance on work of villeins supporting themselves on their own land. The cot-

tagers, cottars, or bordars, had small plots ranging from five to ten acres in their own cultivation for which they worked one day a week on the lord's demesne. Since they probably could not eke out an existence on their own land, it seems probable that they worked on the demesne for wages or perhaps even worked for the villagers or in the village industries.

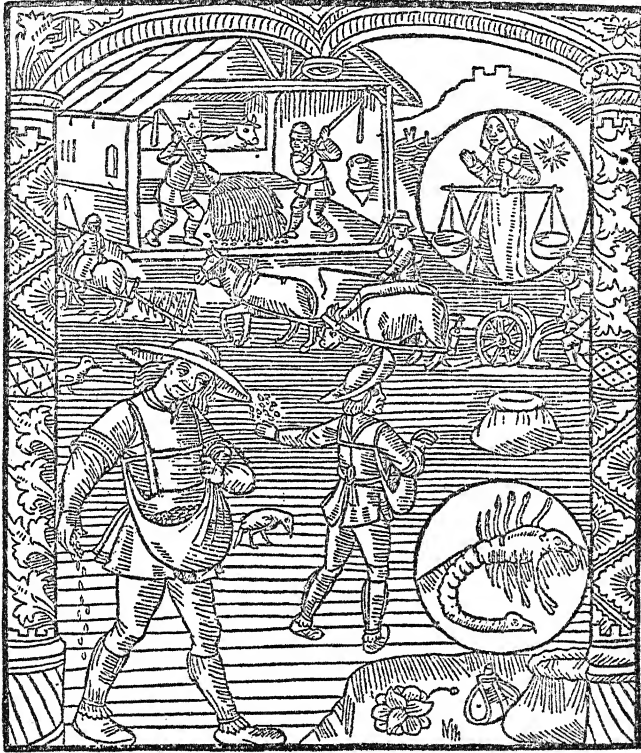
The Villeins

In 1086 the class of villeins comprised some 38 per cent of the population. Their ancestors in Saxon times had been freemen, performing a certain number of days' work each week on the lord's own land. *Domesday Book* refers to them in detail only occasionally. At Marcle, in 1086, 36 villeins plowed 151 acres; they sowed with their own seed 80 acres of wheat and 71 acres of oats. At Leominster in 1066, 238 villeins plowed and sowed 140 acres of wheat with their own seed and paid £11 4s. 4d. as "custom." In 1086, 223 villeins plowed and sowed 125 acres and paid dues of £12 4s. 8½d. Though their burdens were increased, it was not yet necessary to deprive the villeins of their status of freemen. Their wergeld (the compensation paid for a man killed) remained that of freemen; namely, 200 shillings. They continued to be members of the hundred moot or local assembly and were capable of giving evidence in court. Legally a villein might still go where he pleased; but economically he was already bound to the manor because if he went away from it his farming equipment had to be left behind and he lost his equity in the soil which he tilled. The normal holding which the villein cultivated for himself and his family was known as the virgate, a group of acre strips with an area of from twenty to thirty acres.

The Manorial Economy

It is in the connection between the demesne and the villeins that we find in the manorial system potentialities of economic advance. The lord who received the grant of a manor from the king received with it a demesne of considerable extent, upon which more could be raised than was required for mere self-sufficiency. But the problem of labor, both of man power and of animal power, confronted the lord. He could not hire sufficient

labor, and he could not support enough farm animals to do the required work on the demesne. The manorial arrangements made it possible to compel many of the inhabitants of the village to work for him and to draft their farm animals for service on his



Plowing, Sowing and Threshing

demesne. The villeins worked two or three days a week for the lord and to the extent fixed by custom placed their farm animals at his disposal for plowing and hauling. The more plow teams of peasants appertained to a lord's demesne, the more valuable the demesne. Through these work-services the villeins paid their rent for the strips in the fields and for the cottages in which they lived.

In addition to his demesne and its yield, and to the dues from the inhabitants of the manor, the lord, whether a bishop, an ecclesiastical corporation, or a knight, had certain other profits

from his manor. These are generally summed up under the term appurtenances. The woodlands provided timber for building, for fencing, for joinery and furniture, and for fuel. The woods, moreover, were fine feeding grounds for the pigs, who fattened on the acorns and beech mast in the autumn. The privilege of feeding pigs was known as pannage and was not the least valuable aspect of the forest in medieval economy. In one hundred, Barstable, in Essex, there was a forest large enough to provide food for 3982 pigs. In the pannage rights of a village or of a manor all the inhabitants participated, but the value of the lord's share is indicated by such items as this, that at Malling, Sussex, the Archbishop of Canterbury received 300 swine from the pannage of the wood. At Leominster every villein having 10 pigs paid one to the lord for pannage. From the village pasture the lord likewise seems to have derived considerable profit. At Hadfield Broad Oak, in Essex, the meadow rendered nine fat sheep unto the manor, and for the privilege of using other parts of the same pasture, 58 villeins plowed 41 acres of the demesne. It seems to have been the practice for the lord to demand extra plowing from the villein who wanted extra pasture. In one instance in Domesday Book Colsuen, the man of the Bishop of Coutances, took away a common pasture which had been enjoyed by the villagers in the time of Edward the Confessor and even for five years under William the Conqueror.

Every village had at least one mill for grinding grain. Generally mills were in the hands of the lord of the manor. In Dorsetshire there were 272 mills, yielding a rent of from 3d. to 25s. a year. At Petersham 4 mills were worth £42 9s. 8d. a year, or corn to that amount. One mill is noted as being worth "as much corn as can be gained"—all the traffic would bear. Occasionally a "mill rendered eels," that is, the miller furnished a certain number of eels from the mill pond as part of his rent to the lord.

In certain parts of England, especially in the Fen Country, fisheries were valuable appurtenances. Chertsey Abbey received 1000 lampreys and 1000 eels from the fishery at Petersham. Sandwich rendered 40,000 herrings to the monks of Christ Church, and the fishery of Doddington in Cambridgeshire yielded 27,550 eels to the Abbot of Ely.

Domesday Book further mentions 42 markets, which were considered the most valuable of all franchises which could pertain

to a manor. Reference is made also to saltworks, quarries, lead mines, ironworks, potteries, vineyards, ferries, and peat bogs. Thus in one way and another the knights and barons, the bishops, the cathedral chapters, and the monks garnered together all those products of the soil and profits of appurtenances which were not absolutely necessary for the existence, on a none too generous standard, of the life of the masses of the workers. As a result of the increased services paid by the peasantry, and of the greater care exercised by the new Norman lords to make their estates pay, there was during the reign of William the Conqueror a general rise in values of the estates as these are noted in *Domesday Book*. The gross value of Oxfordshire, for example, rose from £1,900 in 1066 to £2,400 in 1086, a rise of 25 per cent. Some individual estates doubled in value. Yorkshire, which was ravaged by William, is a marked exception. Here the values fell sharply, indicating that under Norman administration there was a fall in output and productivity in this county.

Some curious calculations have been made by scholars, on the basis of very incomplete figures, which while not satisfactory give some notion of the way in which the wealth and earnings of the day were distributed. As against the 15 acres which the peasant family cultivated for its subsistence and to meet necessary ecclesiastical, seignorial, and royal dues, the average lord cultivated a demesne of almost 160 acres for himself and his family. If these figures are at all correct, 6,000,000 acres were farmed each year, about one-fourth of the present cultivated area.

In addition to living on a higher standard, the lords, bishops, canons, and monks were the possessors of the wealth of the time. To make certain that the peasants shared as little as possible in the prerogative of accumulation, the lord was the heir of the peasant, and actually took from the peasant's estate after his death the best animal or the best piece of furniture or equipment. From the social point of view the important thing is to know what use the possessing classes made of the wealth which they derived from the agricultural products, dues, profits, and perquisites which flowed in to them from so many sources. Did they put it back into the land to make it more productive? Perhaps to some degree unknown to us they did. It is clear in this connection that during the twelfth century there was a great expansion of settlement sponsored by the landlords.

To a great extent the lords used their accumulations in two other ways. First of all, among the lay lords there were great expenditures for military purposes, either to extend their holdings at one another's expense both in England and in France, or to rebel against the king. Such wealth as the king, the greatest landlord of all, gathered together was spent in keeping nobles in subjection and in warring in France. Then, before the end of the twelfth century came the lure of the Crusades, and many an English lord, from the son of William the Conqueror down, expended his fortune in making the journey to the Holy Land in the hope of recovering the Holy Sepulcher and of nicking a bit of real estate in the shape of a Palestinian lordship from the infidel.

The second great use, during the period just after the Norman Conquest, to which the wealth of the land was put was the building of cathedrals, monasteries, castles, and royal strongholds. Here both laymen and churchmen were active. William the Conqueror built the vast pile known as the White Tower on Tower Hill in London, constructed for him by Gundulf, Bishop of Rochester. Although much of the Tower as it stands today is of later date, the chapel known as the Chapel of St. John, little altered since William the Conqueror's time, shows the skill and care of Norman construction. William Rufus, son of William the Conqueror, built a great palace at Westminster which is said to have been a wonderful specimen of Norman architecture with its two rows of pillars and arches. Outside London Gundulf designed the great castle at Colchester, with a keep 115 feet by 113 feet and walls from 11 feet to 30 feet thick, which still stands. Gundulf erected another at Rochester which was replaced by a larger structure in 1126-1139. William I himself built the great castle at Lincoln in 1068. The great Norman lords filled the land with castles, such as Arundel Castle in Sussex, which were only less elaborate than the great royal structures in London and elsewhere. But since many of these were turned into strongholds against the royal authority, they were destroyed by Henry I and Henry II in the next century.

The bishops, canons, and monks more than equaled the efforts of the king and the lords with their building and rebuilding of cathedrals and monasteries. In a society which made the service of God a prime objective, it is not surprising that a very large

part of the social surplus should be used in this way. Actually cathedral and monastery building was already under way when the Normans came, since Westminster Abbey, built by Edward the Confessor in the new Norman style, was consecrated in 1065. In the fifty years after the conquest an imposing array of great cathedrals and monasteries were built from Durham in the northeast to Exeter in the southwest.

These great structures, the greatest material undertakings of their time, required vast quantities of stone, mortar, lead, timber, iron, and labor for their erection. Their construction must therefore have reacted directly upon the supply of all these items. Unfortunately we know little in detail about developments in these connections. There is very little evidence of Saxon working of iron. *Domesday Book* mentions ironworkers in a number of counties, and the industry seems to have expanded in the following century, particularly in the Forest of Dean. Lead, of which the greatest quantities were needed for roofing, was mined in four areas, in Carlisle in the northwest, in Derbyshire in the west, in the Mendip Hills, and in Shropshire. Tin, incidentally, for which the great churches would have little demand, is not mentioned in *Domesday Book*, and indeed it is not until the middle of the next century (1156) that there is any evidence for the growth of tin mining. Lime for mortar was burned locally; in some places coal was used as a fuel for this purpose at an early date. The stone for the walls and columns of the great churches was often quarried at a considerable distance from the building. Its transportation must have represented one of the major problems of the day. Thus the stone used in the twelfth century rebuilding of Canterbury cathedral was shipped across the sea from Caen in France.

While too much emphasis should not be put on this point, it is probable that the construction of the great churches of the day reacted on lighter manufacturing also. Tilemakers found a market for roofing and floor tiles. Goldsmiths had to meet a heavy demand for sacred vessels for the altars, and weavers were called upon to supply fine linen and wool for vestments and paraments. There seems to have been some development along these lines as a result of lay demand also, in the castles of the nobles and households of lesser men, for *Domesday Book* mentions here

and there glassmakers, pewterers, tanners, potters, founders and leather workers as well as the tilemakers, weavers, and goldsmiths given above as examples.

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Chapter 4

AGRICULTURE DURING THE TWELFTH, THIRTEENTH, AND FOURTEENTH CENTURIES

IN THE two or three hundred years which followed the Norman Conquest, agriculture remained the chief occupation of the vast majority of the people. Rural England was given over to subsistence farming. Manors were held in groups rather than singly, and deficiency in one manor was made good by bringing in the surplus from another held by the same lord, often at a great distance. There was a good deal of intermanorial marketing, but considerable quantities of farm products were sold in neighboring towns or even exported from the country.

The population of England increased from an estimated one and a half millions in 1086 to a figure between two or two and a half millions in 1377. At this date the richest agricultural counties had the greatest density of population. The urban population numbered something like 8 or 10 per cent of the whole.

Factors in Population Changes

As far as our knowledge reaches, this growth is bound up either with continuous decline in the standard of living of the masses of the people or with an increase in the subsistence materials available for their use. For a continuous reduction of living standards there is no evidence apart from the assumption sometimes made that the increase of the rigors of serfdom in the twelfth and thirteenth centuries was accompanied by a decline in the peasants' material well-being. From the beginning of the fourteenth century, however, it would seem that any retrogres-

sion that there had been during the twelfth and thirteenth centuries ceased. The best evidence for this suggestion is provided by certain statistics of the wages of carpenters, masons, tilers, threshers, and laborers working for hire on the estates of the bishopric of Winchester. Between 1200 and 1290 the figures available are so limited in number that no safe reliance can be placed upon them in making a generalization; but taking them as they are, they show a slight upward tendency. After 1290 the records are much fuller, and it appears that money wages and the price of wheat decade by decade moved always in the same direction until 1379; that is, as wheat went up, wages rose, so that if in general there was no gain, there was likewise no loss. Beginning in 1340, after a period of downward prices for wheat and for labor, both moved upward again. By 1360 wheat prices, wages, and the cost of living had reached a new high point, but after this the parallelism of the past period ceased. For while the price of wheat, and with it the cost of living, began a long decline, wages showed an upward tendency which continued to the middle of the fifteenth century, when the records on which this study is based come to an end. Moreover, it appears that as between skilled artisans and unskilled laborers the wages of the latter increased more rapidly than the wages of the former. Thus, while carpenters' pay on one manor rose from 3.12d. to 5.23d. per day or 70 per cent from 1280 to 1453, the mean daily wage of laborers rose from 1.63d. to 4.03d. per day or 147 per cent.

The increase in supplies available for the general body of the people indicated by those figures may have been produced either through a general absolute increase in production accompanied by the maintenance of the same ratios of distribution, or through a change in the distribution of the same quantities of supplies, or through a combination of both of these factors.

Agricultural Progress

A visitor to England in 1066, the year of King William's defeat of Harold, would have been struck by its uncultivated aspect. Everywhere there were Saxon clearings, but there was still much forest and wild land. In the case of Sussex, for example, only its southern district was closely occupied; at least one-third of

the county was wood and forest which extended beyond its borders into Surrey, Kent and Hampshire.

Much of the unoccupied land was primeval wilderness, as in the case of the marshland and the great forests. Some, however, had been devastated by the civil wars of the latest Saxon period. To this the military exigencies of the Norman Conquest were to add other districts, such as the Vale of York. The extension of royal forests by the Norman kings seems also to have reduced certain cultivated areas to a wild state.

On the other hand, the development of the manorial organization which the Normans carried through made for a great increase in agricultural production, as has already been explained. In the second place, the Normans consciously colonized and settled waste and unoccupied areas. The Anglo-Saxon *Chronicle* relates how in the year 1092 King William sent to the country around Carlisle "very many folk, with their wives and their cattle, to dwell there and cultivate the land." The newly founded monasteries of the time were often set "in the midst of a great solitude," which the monks soon turned into rich farm land.

The twelfth century witnessed a remarkable continuation of the work of colonization and the extension of the cultivated areas. One of the most interesting aspects of this movement was the work of the Cistercian monks. The order was founded in 1098 at Cîteaux in France. In 1128 their first English priory was established at Waverly in Surrey. By 1152 these monks had opened about fifty houses, many of these "in places remote from the haunts of men." The Cistercians chose the wildest and most solitary districts; and, because they were good farmers as well as holy men, they transformed their solitudes into prosperous estates. They were skillful in breeding horses and cattle, but excelled in raising sheep. They transformed "much of northern England from a wilderness into a sheep-run." Their wool became an important article of export.

The improvement in farm stock, which they initiated, is one of the most important aspects of agricultural progress of this period. By the fourteenth century England was one of the great sheep-raising and wool-growing nations of Europe. In 1350 England was exporting 30,000 sacks of wool annually, which would represent the wool yield of 7,200,000 sheep, and in addition she was manufacturing 12,000 broadcloths and other cloths, which required the

wool of an additional number of 800,000 sheep. In those regions where sheep could be raised all classes had flocks, ranging from 15,000 head owned by a great monastery down to a dozen sheep herded by a humble cottar.

Other monks joined the Cistercians in the movement to clear new land. Thus in the famous *Chronicle* of Jocelin of Brakelond, the Abbot Samson of the monastery of Bury St. Edmund in East Anglia is described as making many clearings and bringing land into cultivation, building barns and cattle-sheds, being anxious above all to dress the land for tillage.

Laymen pursued the work of opening new land to cultivation no less zealously than their monastic contemporaries. During the latter part of the twelfth century, and running on through the thirteenth and fourteenth centuries, there is evidence of the founding of many new settlements, especially in the northwest in places which are described as having previously been meadows, woods, and pastures. Villages bearing the suffix "thwaite" (clearing) date largely from this period. Individuals or groups of free tenants were permitted by a lord to take up uncultivated land; in other instances the peasants of an entire village participated in the process. In the first case where an individual occupied the clearing, the new farm, known as an assart, remained outside the village economy; in cases where the village as a whole effected the expansion, the land was divided into acre strips and considered as part of the village fields.

It is possible in a few cases to trace the gradual addition of such land to the cultivated area. In the case of the village of Islip in Oxfordshire all the land that was under the plow at the time of the Domesday survey was an area of about 1000 acres lying north of a little stream, the Ray, which flowed through the village. South of the Ray, where in later times there were cultivated fields, there was in 1086 a pasture three furlongs long by two broad. The gradual cutting down of the forest and the plowing up of the land added more than half again as much to the cultivated area. Again, in the accounts of the manor of Westerham in Kent, in about 1300 all the cleared land of this manor amounted to "rather more than 500 acres." By the middle of the fourteenth century (1350) the destruction of woods, undergrowth, and thorns brought the cleared area used for planting crops up to more than 700 acres. To give another example, the Manor of Hooton Pagnell in York-

shire at the time of the making of *Domesday Book* had 200 acres of wood and little more than 700 acres of arable land. By 1595 the area farmed came to 931 acres. From the maps given in the volume which describes the history of this manor it is indicated that most of these additions were made before 1260.

Indeed the practice of adding to the cultivated area by the improvement of the waste lands assumed such proportions that during the thirteenth century it was twice regulated by statute in the Statute of Merton and the Second Statute of Westminster. Provided that the lord of the manor permitted enough of the waste to remain to satisfy the legal rights of others who had claims, he was authorized to make such use of waste as seemed good to him. In other words, as long as the land still left as waste was sufficient to satisfy the requirements of those who were entitled to pasture their cattle and cut timber and fuel there, the lord could clear and farm the rest.

The Two- and Three-Field Systems

There was still another way beside the clearing of the new land by which the amount of land cultivated each year was increased. This was through an alteration in the system of fallow. Generally speaking, in the period before the eleventh century in a great many villages one-half the land was planted with crops while the other half was permitted to lie fallow to recuperate its fertility under the influence of the sun and rains and to be cleansed of weeds by two or three plowings. Other villages had a three-field system, in which two fields were planted each year while the third lay fallow. It seems that the three-field system existed in some villages before the year 1000 and that in other villages the two-field system continued long after that time. Yet in some cases there seems to have been a transformation from the two-field system to the three-field system during the eleventh, twelfth, and thirteenth centuries. Where such a change occurred, instead of half of the land's being cultivated each year, two-thirds was under plow, a gain of land on which crops were raised by one-sixth of the area of the village arable. Moreover, there was a saving in animal and human labor which might well be used elsewhere. For in a manor of 600 acres the planted half was plowed once and the fallow half at least twice, a total of 900 acres of plowing. On the same manor cultivated

under three-field rotation 400 acres were plowed once and 200 acres twice, a total of 800 acres of plowing. That a change-over from the two-field system to the three-field system was under way is indicated possibly by the fact that Walter of Henley, a writer of the thirteenth century, recommends the latter and gives an example to show that a plow team could cultivate 180 acres under the three-field system but only 160 acres under the two-field system. The change from the two-field to the three-field system was particularly important in the northern half of the Midlands. South of the line represented by the old Roman road known as Watling Street the two-field village was apt to continue untransformed.

	Two-Field System	Three-Field System
Area	160	180
Area to be planted each year	80	120
Area fallow	80	60
Amount of plowing, once on the field to be planted and twice on fallow ..	$80 + (2 \times 80) = 240$ $120 + (2 \times 60) = 240$	

Increased Yields of Grain

A third element in the story of agricultural progress during the twelfth, thirteenth, and fourteenth centuries is the problem of an increase in the yield of grain during these centuries. This must be considered along with the opening of new lands to cultivation and the transition from the two-field to the three-field system.

Recent studies make it fairly certain that agricultural production increased at least slightly during the centuries under discussion. For a time a good deal of popularity attached to a theory that the English land was gradually impoverished and that the wheat yield fell as the Middle Ages progressed from a high of ten bushels an acre to as little as six and a half or seven and a half bushels in the fourteenth century. It is now believed that this view is incorrect, and that the trend of the medieval English grain yield was slowly, almost imperceptibly, upward. One scholar has plotted a curve which shows a rise from eight bushels of wheat per acre in 1200 to eight and one-half bushels in 1450. Other figures seem

to indicate that the ratio of yield to seed seems to be always higher in the best years of one period as compared with the preceding period, and the number of years of poor harvest with low ratios of yield to seed seems to be less numerous as time goes on. Thus, for the estates of Crowland Abbey in the twenty years 1271-1291, the highest yield was 6.07 quarters of wheat for every quarter of seed. From 1291-1308 the highest yield was 6.9 quarters; between 1361 and 1381 it was 7.6 quarters; and between 1381 and 1401 it was 9.93 quarters. All these figures are for demesne yields and give no indication of what the peasants did on their own holdings. It may be argued on *a priori* grounds that, since the peasants were gradually recovering their freedom during the thirteenth, fourteenth, and fifteenth centuries, they put their backs more steadily into the cultivation of their own fields and thus increased the yield of those parts of the manors held in peasant tenure. There is, however, no documentary evidence that this was so, though it well may have been the case.

There is one other factor in the story of agricultural progress which must be considered. This was the movement, during the thirteenth century, led by the landlords to increase the extent and yield of their demesnes. During the twelfth century manorial lords had frequently been more interested in a money return from their manors than in products in kind. They had leased out all or parts of their demesnes to their villein tenants. As the need for villein work services was thus reduced, the villeins were often permitted to make a money payment to the lord instead of performing their accustomed services. During the thirteenth century, with advancing production and the possibility of selling crops for cash in the towns and markets, the direct cultivation of the demesne by the lord became more profitable than leasing it had been. Lords began to let their earlier leases fall in and to resume direct cultivation of their manorial demesnes. They began to keep elaborate farm accounts of the land which they themselves farmed. They frequently demanded the resumption of labor services from their villeins and even sought to increase their demands. As a result, during the thirteenth century, labor services were reimposed in many cases where they had been commuted for money payments during the twelfth century and were even increased beyond their earlier amounts. This was made easier for the landlord to do in view of the reduction in the legal status of the villeins which

had been effected during the twelfth century. So unlimited, in theory at least, were the rights of the lord that Bracton, a lawyer of the time, declared that a serf did not know in the evening what labors he would have to perform the next day.

The decline in peasant status continued on certain manors throughout the thirteenth century. Not only were labor services resumed but arbitrary entry fines were used to augment peasant payments, and labor services and money dues were increased. This was especially the case on the estates of the great monasteries and of the greatest barons, who maintained their hold over the unfree serfs and, as markets for their products developed, increased the yield of their demesne farms by putting pressure upon their serfs to provide them with more services. "Such an intensification [of pressure for increased services] is observable in Northumbria, the Danelaw, the Eastern Counties, Wales, the Midlands, and the South of England."

. Yet on the whole, while the increase of services continued to be the rule on the greatest estates down through the thirteenth century, it seems to be true on the small and medium-sized estates, especially when the demesne continued to be leased, that the prevailing tendency after 1200 was the growth of the practice of collecting rents in money in place of work services.

The Rise of the Money Economy

Besides an increase in production in the period under discussion it seems almost necessary to postulate an improvement in distribution which operated to keep additional supplies from accruing exclusively to the advantage of the upper classes. Otherwise there might have been merely the augmentation of luxurious living on their part instead of an increase in the number of ordinary people living down on bedrock. The changes in distribution which actually developed seem to have been entirely unpremeditated and unplanned. Until we know more of what happened, it is necessary to label them as the result of fortuitous circumstances.

The most basic element in the whole proceeding seems to be the commercial expansion and the increased use of money which developed during the twelfth and thirteenth centuries. Owing to the transfer to Europe by the crusaders of the looted hoards of silver of Asia Minor and Syria and also to the opening of silver

mines in the Harz mountains of central Europe, the minting of coin in considerable volume was made possible. Whereas in the past coined money was actually so scarce that most men never even saw a piece of it during their whole lives, now there was a certain amount of money in circulation among the people.

The mere existence and more frequent use of money had a curious effect upon the usages upon which Norman England depended to bind people together into a social entity. Its appearance gave meaning to the monetary values which were attached to goods and to labor services. As commercial transactions familiarized men with the advantages of exchanging goods and services for each other on the basis of their money values, they began to abandon the crude feudal arrangements of the performance of service in exchange for the right to hold a piece of land. During the twelfth century King Henry II allowed his knights to redeem their fighting services for a money payment, and, as already noted, manorial lords permitted their villeins to make money payments in lieu of services.

This process is known as commutation of services for money. On many manors where it had proceeded during the twelfth century it was revoked during the thirteenth century as lords called in the leases which they had granted on their demesnes and resumed the direct farming of their demesne land. Yet the process was renewed again at a later time; and indeed on some manors it seems to have continued without interruption.

From the social point of view an important feature of the process of commutation was the price which the peasants paid to "buy" their work. It was generally the current price of labor at the time. Such was the power of custom that once a rate was used a few times in such arrangements it became regularly established.

In the first instance these "sales" of labor services to the peasants were initiated by the lords of the manor. At best forced labor services were inefficient and no amount of pressure, not even the warnings of the priest in church that slackness in doing one's required work was a grievous sin, availed to make the ordinary serf throw his back into the jobs he did for his lord. Hired labor was not subject to traditional notions of what it would and would not do; if the hired laborer grew slack he could be dismissed without more ado; and a sense of emptiness in the region of the stomach

soon brought him about. Consequently, if the lord could get from his serfs a penny a day for their work and then use the same penny to hire labor, he clearly gained. That is to say, he gained immediately, but not for long. For wages, as already indicated, went up during the thirteenth and fourteenth centuries, while the rate at which the lords sold the peasants their services became fixed. What the peasants paid no longer sufficed to enable the lord to hire laborers in their place. Wherever this process of selling the serfs their labor dues was introduced, the net result was to give the serfs a great advantage. They secured freedom from their services for a sum which was very much less than they were worth. This was the development which seems actually to have taken place during the course of the thirteenth century on the small and medium-sized estates, particularly in regions where production (apart from subsistence) was for local markets, where there was a numerous landless class, or where the presence of a large free population prevented the landlords from ever attaining anything like the power wielded by the great barons and rich abbeys.

Striking as it was, the commutation of services into money payments was not the only gain which the money economy and the rise in prices brought to the villeins on these manors. For in addition to services they paid certain other dues representing ancient tributes and rents which had long since been reduced to money terms. When actual money began to be paid in satisfaction of these dues the serf here too gained by every rise in the price level. For the money which in 1066 represented the price of a bushel of grain came to be worth only a fraction of that amount. The grain which the serf grew increased in value; the number of shillings and pence which he paid to the lord was unchanged. The importance of the gains of the peasantry on this score alone was as great in some districts as the gains by the commutation of services and even greater in the majority of cases, if there is justification for the contention of one scholar that in the thirteenth century money rents were of greater value than labor dues generally throughout England.¹

The freehold tenant, too, benefited by the price changes attend-

¹ Church tithes, heriot, and banalités continued to be paid in kind. Labor services reached the highest proportion in Essex, Middlesex, Suffolk, Norfolk, Cambridge, Herts, Hunts, Northampton, Lincoln, and the South of England. In these counties services were 40 per cent of all tenant payments

ing the advance of the money economy, since he paid virtually all his rents in terms of money. As the burden of his rents decreased and the price of his products rose, he was able from time to time to buy additions to his holding. The freeholder became so prosperous that he sometimes rose to economic equality with the knight and might even assume the knightly title.

During the fourteenth century the Black Death swept England on a number of occasions. During one visitation, between 1349 and 1351, the number of deaths was so great that there was a shortage of workers in both country and town. The government attempted to fix prices and wages at their normal levels, but the lords of the manors in certain cases endeavored to protect themselves by reinforcing their rights to forced labor. In instances when commutation had not gone very far the process was halted. Yet in the long run commutation was resumed within a comparatively few years.

The enforcement of the government's legislation freezing wages irritated the laboring classes, while the continued insistence on serfdom and its obligations by landlords outraged the peasantry. The result was a revolt in 1381, in which peasants, country laborers and town workers participated, against wage-rate enforcement and the continuance of serfdom, and in favor of low level commutation payments. Though the revolt was suppressed with savage cruelty, the fifteenth century saw the abandonment of serfdom nearly everywhere and the general commutation of services into money rents.

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in value. In all areas except the eastern counties the money rent of villeins formed the greater part of total rent payments. During the thirteenth century labor services were increased, and there was a decline in peasant status. The free were partially deprived of their freedom.

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Chapter 5

MARKETS, FAIRS, AND TOWNS IN THE MIDDLE AGES

EVERYONE knows that the products of the forest, mine, and farm must be processed before they can be used. Stone must be cut and shaped, iron smelted and forged, timber sawed into boards and joined, wool spun and woven into cloth, leather tanned and cobbled, grain milled and flour baked. A good many of these operations were performed on the manorial farm. Every village had its masons, carpenters, spinners, weavers, smiths, millers, and bakers. In some cases these workers, especially in the spinning of yarn and weaving of cloth, put only their spare time into their occupations or the work was part of the routine of the home. Women spent what time was not devoted to household and field duties in spinning, weaving, knitting, and sewing clothing for the family. In all probability the men employed many a winter day in shaping wooden bowls, trenchers, spoons, and perches (to hang clothes on) for domestic use. On the other hand, the appearance of masons, smiths, carpenters, and millers in the manorial accounts suggests that a certain number of men in the village paid their major attention to special occupations. They might, of course, still find by-employment in farming. In some instances their specialization grew out of the necessity for acquiring great dexterity in a difficult craft, such as carpentry; in others it seems to have been connected with the necessity for having a lot of complicated apparatus such as a mill, a tanyard, or a smithy to work with.

In the very nature of things, owing to soil, climate, and the way in which the earth's crust is formed, certain crops are grown to better advantage in one place than in another, and minerals can only be mined in those places where they were deposited in the geological past. There seems also to be such a thing as a tra-

dition of skill in doing certain kinds of things which for some reason or other has developed more highly in one region than in another. Thus, while there is no earthly reason why anyone should not learn how to plait straw, as a matter of actual fact plaiting straw was a skill which was developed in certain small areas.

Advantage in the supply of raw materials and local skill in the production of one thing in one place and of another in another place led men to exchange their goods. There is nothing difficult to understand about this. A farmer producing good cows beyond his own needs might like to exchange them for sheep. Or the housewife with a good hand for butter might seek to exchange it for another woman's yarn or cloth.

Economists have a way of speaking of "utilities" or values which are added to goods in various ways. Processing operations, such as sawing or spinning, add what is called "form utility." That is easy enough to see. It is a little more difficult to recognize the actuality of what the theorists call "time utility" and "place utility." By these terms they mean the values added to goods by their being available at a certain time and being brought to a certain place. The people who deal in these utilities are of a somewhat different order from those who create form utilities. In contrast to the "producers" or "manufacturers," they are known as merchants. It is their business to gather all goods seeking exchange and to bring them to a certain place at the time when they are wanted. In the simple illustration of the woman who made good butter, she was probably both maker and merchant, because she herself carried the butter to a near-by market—in the simplest case her neighbor's house—and sold it by taking her neighbor's cloth in exchange. By such an exchange both parties would benefit and both might be induced to produce more of the things they could make well in order to be able to secure more of the things they wanted.

But business transactions soon have a way of becoming much more complicated than this simple business of exchange between neighbors. For the sake of convenience, men with cows, grain, or wool to sell and those who wanted to buy these things in exchange for their own goods met at a village, often where their roads crossed, and there they established a market for the regular exchange of their wares.

Markets

If such a village market assumed any regularity and was attended by any large number of people from the surrounding villages, the lord of the manor might recognize its possibilities for profit to himself, and under some pretext of service claim a toll on the sales. By the time that *Domesday Book* was drawn up 42 markets were sources of profit to the lords of the manors in which they were held. The market at Neatham (Hants.) was valued at the large figure of £8 annually, but the more general yield seems to have been from 30s. to 50s. a year. The theory presently grew up that a market was a franchise, that is, a property right, and that a new market could be established only by royal grant, which was given only after an investigation (*inquisitio ad quod damnum*) was held to ascertain whether any other market would be injured by the new establishment.

Fairs

The market was a periodic meeting of buyers and sellers, held perhaps once a week and attended by local folk. Salt, iron, hay, grain, butter, cheese, cattle, sheep, wood, leather, earthenware, fish, and wares produced in the manorial households would be bought and sold. Another variety of periodic coming together of buyers and sellers, held annually and attended by buyers and sellers from a much wider area, was the fair. Although life in the Middle Ages was hard-bitten much of the time, the irrepressible buoyancy of the human spirit insisted on expressing itself from time to time and found the occasion for gala in saints' festivals and pilgrimages to saints' shrines. A body or even a bone or a whisker of a reputed saint was excuse enough to bring country folk together in vast concourses on the day of the saint in question. These gatherings early became more than occasions for jollity. Men took with them the products of their work in the hope of exchanging them for articles they could not buy in their weekly markets. Chalice, vestments, embroideries, velvets, linens, silks, cloth of gold, furs, amber, and beautiful service books mingled with supplies of salted herring, wax, wine, grocery wares,

spices, and cloth. Goods were brought not merely from far distant counties but even from overseas.

Every fair had certain characteristic features. It was generally held in a churchyard, and though the Statute of Winchester (1285) sought to end this practice, the churchyard at least in some cases was still used in the fifteenth century. It was held only once a year, but might last a few days or for several weeks. It was established by royal charter unless it rested on prescription "from a time whereof there is no memory," and was the property of some lord, monastery or other corporation, or town, which made a profit out of the tolls or sales, the rent of the booths, and fees of the fair court. St. Botolph's fair produced £90 in rents and stallage and £40 in court fees in the latter part of the thirteenth century. Near the end of the reign of Henry II, St. Giles' fair yielded £146.

The law of the fair was not the common law of England, but the Law Merchant, a body of regulations recognized by merchants all over Europe as binding in their business relations. The fair court where disputes between buyers and sellers arising at the fair were settled was known as the court of Piepowder or "Dusty Foot," because of its expeditious procedure and speedy judgment.

The fair was open to all merchants and dealers, native and foreign, and while it was in session ordinary business in neighboring places was often stopped. Some of the English fairs, of which there were eventually many hundred, remained important for centuries. The fair of St. Ives, founded in 1110 by Henry I, was a great market for hides, wool, and cloth. The fair of St. Giles at Winchester, founded by William Rufus in 1096, was a center for commerce between England and France. The stall set up in this fair by St. Swithin's convent was famous for its wines and spices. Stourbridge fair near Cambridge was founded by King John, who granted it to the lepers of the Hospital of St. Mary Magdalene. This fair continued to be important down into the eighteenth century, when Defoe spoke of it as "not only the greatest in the whole nation, but in the world." Bartholomew fair at Smithfield (London), established by a grant of Henry I to the prior Rahar, was jointly owned and managed by the priory of St. Bartholomew and the City of London. It was notable for its cloth trade. In founding the Westminster fair Henry III provided that the citizens of London must attend it, and that no

other fair was to be held and no shop was to be open in London during the time it was in session.

There was a kind of ebb and flow in the prosperity of individual fairs as business shifted. Thus in 1335 a complaint was raised that "foreigners do not come to St. Botolph's fair (Boston) as they used to do," and in 1416 it was again said that St. Botolph's fair had entirely ceased "now for many years past." On the whole, until the fifteenth century the fairs were of great importance; and even though they declined relatively after that, they still continued to be held and to carry on a great deal of business well into modern times.

Towns

Fairs and markets provided periodic opportunities for buying and selling. They were not necessarily connected with urban centers, but actually they frequently were. This was so because the fair was established in or near a place which was already a center for business, and because the market, even though it started in a village, frequently stimulated the growth of the village and led to its development into a town.

The Anglo-Saxons did not appreciate town life; and even though they sometimes settled their camps on the sites of ancient Romano-British cities, as for example the Kentings in Canterbury, they did not make use of the houses or other survivals of the Roman past. Saxon society was rural, and the best opinion today seems to be that city life as it existed in the period of the Roman occupation of Britain entirely ceased after the Anglo-Saxon Conquest. Even London, where a few thousand miserable squatters continued to live on the site of the Roman town, did not have a continuous existence as an organized municipal community.

There were various ways in which urban life was reintroduced into England during the Anglo-Saxon period. The Danes, for instance, after their conquest of the Danelaw in the ninth century, founded towns as centers from which to maintain their control of the subjugated territory. Lincoln, Leicester, Stamford, Nottingham, and Derby are five of the most famous of their foundations, useful both as garrisons and as centers of the trade in which the Danes were so much interested. As the kings of the house of Wessex gradually reconquered the Danelaw during the tenth cen-

tury, they adopted the garrison policy of the Danes, setting up towns in the land as their advance continued. In other parts of England towns developed around the royal manors from which the king's reeve supervised the royal estates in the region.

Another group of towns came into existence around monasteries, cathedrals, and castles. A great cathedral, a set of monastery buildings, or a castle would require a considerable staff of masons, roofers, carpenters, and janitors for its upkeep; and the household requirements of the bishop, the dean of the cathedral, and the canons were not inconsiderable. A cathedral in consequence was very apt to be surrounded by a group of workers. The city of Durham grew up around the great fortress-like cathedral which was the northern English outpost against the Scots. "In front of the door of the church" at Abingdon ten traders dwelt; and outside the walls of the monastery at Bury St. Edmunds there was a settlement of "bakers, ale-brewers, tailors, washerwomen, shoemakers, robe-makers, cooks, porters, and agents. And all of these daily wait upon the Saint, and the Abbot, and the Brethren." Monasteries and cathedrals, of course, often contained saints' shrines, and, to provide for the concourses of pilgrims, cookshops, lodging houses, and souvenir shops were bound to spring up. In counties where there was danger from lawless elements, such as Herefordshire which was exposed to the Welsh raiders, men and women might gather around castles for protection.

Although little groups of people were brought to live more closely together in later Saxon and in Norman times in these and perhaps in other ways, the communities which actually attained any importance as urban centers were virtually all characterized by the additional fact that they were favorably situated with respect to trade and communication. Otherwise they slipped back and were to be distinguished from villages only by certain legal privileges which they might have managed to obtain.

By the time of the Norman Conquest there were already a good many towns in existence in England. London, York, Canterbury, Bristol, and Winchester were flourishing communities when William landed on the island. The Conquest was accompanied by a certain amount of devastation and destruction of town property, partly to make room for castle building and partly as a result of the operations of the fighting forces. At Lincoln 166 houses "were destroyed on account of the castle" and 74 were in ruins

because of "misfortune, poverty, and ravage by fire." Yet the internal peace with which the Norman rulers replaced Saxon strife gave the towns a chance to grow. England was in immediate contact with Normandy, the most advanced land in western Europe. Artisans and merchants from the continent immigrated and settled in the English towns. "Many natives of the chief Norman cities, Rouen and Caen, settled in London as the foremost town in England, because it was more suited for commerce and better stored with goods in which they were accustomed to trade." Finally the Norman barons initiated a deliberate policy of town colonization along the borders between England and Wales.

Yet the towns and cities of the Norman period were none of them large. London, Bristol, and Winchester are omitted from *Domesday Book*, so that we do not know their population. In the other boroughs of England in 1086 there were 7,968 burgesses or perhaps 40,000 inhabitants. Population does not seem to have increased rapidly until the thirteenth century, and even long after that all English towns remained comparatively small. The cathedral city of Worcester contained 1800 people in 1280. The town of Cambridge had 400 houses in the time of Edward the Confessor (last Anglo-Saxon king who died in 1066) and 534 in 1279. In 1377, according to the poll tax of that year, there were in England 9 towns of over 5000 persons, 11 towns ranging from 3000 to 5000 persons, 19 towns with a population of 1000 to 3000; and three towns with fewer than 1000 people. London had 37,300 inhabitants; York, 11,500; Bristol, 10,150. Plymouth (7700), Coventry (7700), Norwich (6300), Lincoln (5400), Salisbury (5100) and Lynn (5002) were the other towns of more than 5000 persons. Rochester, Bath, and Dartmouth had each less than 1000. The 42 towns listed in the tax roll had 179,500 inhabitants out of a total population in England of two or two and a half million persons. Perhaps one man in ten or eleven lived in a town; the rest lived in the country.

Nevertheless, the towns have a significance which transcends their numerical importance. They were the nerve centers whose functioning developed certain of the characteristic features of modern civilization. The growth of towns undermined the self-sufficiency of the manor. They provided constant markets where surplus food could be sold to feed their inhabitants, and they

held out the temptation of fine manufactured wares which the richer farming classes were eager to buy. The towns made specialized production in various areas possible, by providing markets where such goods could be sold and needed products not raised at home could be purchased. The towns were the centers of mercantile communities, made up of merchants from many lands who dealt in products not obtainable locally which added to the comforts and refinements of living. Thus as early as the reign of Aethelred (979-1016) there were merchants from the Netherlands, Germany and France in London who brought to England lumber, fish, blubber, cloth, gloves, pepper, vinegar, and wine and took in exchange wool, grease, and cattle. A list of a merchant's importations in the middle of the eleventh century includes gems and precious metals, fine cloth, perfumes, drugs, ebony, glass, wine, and oil. To the city of London, wrote William Fitz Stephen in about 1183, "from every nation that is under heaven merchants rejoice to bring their trade in ships."

Woolen Cloth Manufacture

Cities again were the depots in which the business of processing goods for sale to others, which we call manufacturing, as distinct from the older practice of processing in the household, found a convenient base. This was especially true of the manufacture of cloth. During the twelfth and thirteenth centuries almost every important town was engaged in this industry. In the reigns of Henry I and Henry II (during the twelfth century) weavers' guilds were established in London, Oxford, Lincoln, Nottingham, Huntingdon, Winchester, and York. There were other towns also where cloth manufacture was important, such as Stamford, Gloucester, Darlington, and Worcester, beside a whole group of towns in Yorkshire. As early as 1265 English cloths, known as Stamfords, were being imported into Venice.

The convenience of towns as centers of commercial cloth manufacturing in the earlier centuries appears readily when a list of raw materials used in the industry is considered. In addition to the wool itself fuller's earth, dyestuffs, alum, and teasels were needed. Alum was imported from the Mediterranean; dyestuffs from Picardy and Toulouse. Even teasels were imported. The fuller's

earth was obtained from three regions in England. Only in a town could all these supplies be secured easily by the manufacturer.

As early as the middle of the thirteenth century Parliament sought to encourage manufacture still more by prohibiting the export of wool. Thus in 1258 it was ordered that "the wool of the country should be worked up in England and not be sold to foreigners and that everyone should use woollen cloth made within the country." In 1271 the export of wool was again prohibited, and foreign cloth workers were promised special privileges if they would come to England to make cloth.

During the early fourteenth century a series of changes took place in the cloth trade. In town after town complaints were raised that the weavers had decreased in numbers. In London the number of weaving looms was said in 1321 to have fallen from 380 to 80. At first glance it might seem that the English had not kept up with improvements in technique and fashions which had been worked out on the continent and that their product could not be sold in competition with the fine continental wares. In any event the government of Edward II forbade the importation of fine fabrics from abroad, except by the well-to-do, and planned to settle artisans from the Low Countries in England. This project was actually carried out by Edward III. "In view of the decay of the art of weaving" Edward III gave letters of protection to John Kempe of Flanders and a company of men, servants, and apprentices, who came to England to exercise their craft there. Other foreign weavers came in later years, and these foreign artisans are found settled in London, Winchester, Norwich, Bristol, Abingdon, and York.

Without doubt this was a time of difficulty for many of the clothmakers. Yet the so-called decline seems to have been less a process of retrogression than of transition in manufacturing technique. Fulling was the process by which the cloth after it came from the loom was washed and shrunk with the aid of fuller's earth. During the thirteenth century a machine known as "the stocks," driven by water power, was invented to replace the laborious work of fulling by hand. Most of the older cloth towns were situated on the lower reaches of the rivers where the current was sluggish and provided insufficient power to run the new mills. Fulling mills began to be built on the upper reaches of streams where greater power was available or in valleys where a new type

of overshot wheel could be installed. Around these new mills cloth workers began to settle, all the more readily since the array of gild restrictions which had grown up in the older towns were regarded as much too restrictive by the more ambitious manufacturers. The "decline" seems to be in reality an "industrial revolution." What has been said here applies to the woolen cloth trade, which used the short-stapled wool fibers for making cloth. The other branch of the trade, the worsted industry which used long-stapled fibers, did not need much mechanical power. Yet here, too, during the fourteenth century there was a shift from urban to rural centers, perhaps to evade gild regulations or perhaps to secure cheaper or more abundant labor.

On the basis of the manufacture of cloth many towns attained unusual prosperity during the fifteenth century. This is shown by the beautiful parish churches built in those places which led in clothmaking, erected as much to the honor of the clothmakers as to the glory of God. New town halls and bridges were constructed, often as forms of benefactions which rich citizens provided for in their wills. On the other hand, even those towns which did not make cloth give indications of progress in the amenities during the fifteenth century, so that other activities beside the cloth trade must be recognized as important.

Town Rights and Privileges

Towns had a further significance besides being centers for mercantile and industrial pursuits. They were peopled by ordinary folk with no noble or aristocratic background. Yet these people soon mastered the technique of accumulation of wealth, which they used not for war or for ostentatious consumption, but for the further development of their business. Finally they early learned how to manage their own affairs.

Until quite a late date in their history, towns retained certain marks of their agricultural origins. Many of the townsmen seem to have had land on the outskirts of the city which they cultivated as a subsidiary occupation to their work in commerce or in manufacture. Still more significant, in many towns the citizens owed villeinage services and dues to the king, to a monastery or bishop, or to a baron, which were exactly the same as their grandfathers had owed when the town was only a manorial village. No com

mon effort on the part of townsmen was more continuous than the struggle to secure the commutation of these dues and services into a money payment, collected by town officials, and paid without any accounting to the proper authority of the way in which the sum was raised. Many of the larger towns developed on the king's land; and in a general way the king was content to take money in place of ancient dues, provided it was paid regularly into the exchequer. The towns on the land of the lay lords, the barons, while less favorably situated than those on the estates of the king, could still count on the lord's eventual need of money to provide the opportunity to wring concessions from him. Those towns owned by the ecclesiastical corporations were less fortunate. With a few exceptions the church corporations were extremely reluctant to grant any privileges, and the struggle between them and their towns lasted for centuries. Even when a point was yielded, there was no generosity in the grant. At Bury St. Edmunds the townsmen commuted their obligation to reap the monastic demesne for a payment in money. The abbot's cellarer went through the town to collect the tax, until the old women came out and brandished their distaffs in his face and cursed him and his men. The extent to which the church bodies retained their control is remarkable. In many towns they elected the mayors, insisted on the monopoly of their mills, imposed yearly taxes for the right to buy and sell, collected tolls, held courts and took the judicial fees, regulated the sale and inheritance of land, and imposed inheritance taxes, merchet, and agricultural services. Sometimes the townsmen broke out in violent rebellion in the hope of ending their burdens. Thus in 1327, to give but one of many similar incidents, the men of Bury St. Edmunds forcibly entered the monastery, beat and wounded its servants, and carried the abbot off to prison. They "mowed the meadows, felled the trees, and fished the fishponds of the abbey, taking away the grass, trees, and fish." In the end, however, they returned to their former situation. Even the Reformation brought no relief to some of these aggrieved municipalities, for in some cases the rights of a medieval monastery were merely transferred, as at Peterborough, to a modern dean and chapter, who exercised their control down into the nineteenth century. Yet even a lay lord was occasionally as tenacious; for in the case of Manchester, the lord of the manor of Rolleston Hall compelled the citizens to mill

their flour and bake their bread in his mills and ovens; and he did not give up entirely his hold on the government of the municipality until near the middle of the nineteenth century.

Where towns were able to secure concessions from the lord or king, as so many of them did during the twelfth and thirteenth centuries, one of the first privileges they sought was the *firma burgi* or farm of the borough. This comprised the right to manage the revenues of the town without the intervention of any outside officials. In fact such "rough and powerful officers" were expressly excluded from entering the town at all. Through officials elected by themselves the citizens collected the market tolls, the profits of the court and, if the soil also belonged to the king, the rents of the burgages or tenements. A certain agreed-upon sum was paid into the Exchequer. Thus Middlesex was "farmed" by the citizens of London for the sum of £300. Henry III granted the farm of Bristol to its citizens in 1227 for a term of eight years at a rent of £245, and on later renewals of the agreement he raised the amount. But regular increases were scarcely the rule, since the wily townsmen soon discovered that pleas of "decay" and "depopulation" would secure reductions. No cry is more familiar in the fiscal records of the Middle Ages than that of the poverty of the towns; and, indeed, many scholars have taken these laments at so much like their face value as to picture town life in the fourteenth and fifteenth centuries as a losing fight with poverty and deterioration. The petition of Winchester, in 1440, is simply the most touching of many similar efforts to secure remission of payments. It sets forth that the city "which in ancient times was chosen out for the coronations and burials of kings, through pestilence and loss of trade, has had eleven streets, seventeen parish churches, and 987 messuages in ruin during the last fifty years, and is so impoverished as to be unable to support the payment of its fee-farm."

The very existence of the farm of the borough imposed upon the townsmen the necessity for common contributions, as did the obligation found in some towns, such as Chester, Lincoln, and York, to maintain the town wall in a state of good repair. It suggested itself to these good men very much on the make that the obligation to contribute involved the privilege of monopolizing all possible benefits which town life created. They jealously arranged all town trading privileges. They imposed strict controls upon

business within the town, sometimes in the interest of the townsman as consumer but very frequently in his interest as producer. They regarded all other towns as foreign; and, suspecting them of trying to cut in on their own business, they treated them as hostile powers.

The Gild Merchant

The mercantile monopoly of the townsmen was organized in the gild merchant. This was an association of the qualified traders with the exclusive right for its members to buy and sell within the town, wholesale or retail, on market days and at all other times, without the payment of toll or custom. The right to organize the gild merchant rested on a grant in the town charter. About one hundred towns in England had such an association, the earliest of which dates from the charter of Burford, 1087-1107. Not all burgesses of a town were gildsmen, nor were all gildsmen burgesses. The payment of the tax for trading, known as scot and lot, was the criterion for membership in the gild, as the payment of other taxes was for citizenship. Trading and political life were kept separate in theory, but for practical purposes the community of the gild and the community of the town coincided and were eventually merged.

When the monopoly privileges of the gild merchant were relaxed, as was frequently done, it was only because the interests of the participating gildsmen were better served in that way. In order to give "foreign merchants" a chance to bring in those goods which the town actually required or to buy and export those wares of which the town had a surplus, non-gildsmen were permitted to buy and sell, provided they dealt at wholesale only, paid toll unless they came from a town which had exemption by royal charter, and did not traffic in those goods such as grain, wool, hides, and raw cloth, of which the supply was limited. The prohibition of trading at retail was not applied to country folk coming to the weekly market, though they were required to pay toll.

The sense of a common interest in the business of the town which was implicit in membership in the gild merchant was constantly exploited by the less competent brethren in a dual effort to protect themselves against the superior ability of their colleagues and to maintain themselves against the consuming public.

Price cutting was discouraged to the point of violence. Thus in 1397 when a herring merchant of Scarborough sold his merchandise "at a less price than other merchants," they "assaulted him, beat him and ill-treated him, and left him for dead, so that he despaired of his life." It was a common rule that a gildsman should have a share at the original price in all merchandise which another gildsman bought. Sometimes the proviso was made that in order to claim participation in a bargain, a gildsman must be present when the transaction was completed. A foreign merchant was placed at a disadvantage by agreements among gildsmen regarding prices to be offered for his cargo. Thus at Bristol when a ship docked the gild assembled to decide "what is to be done in that behalf for the weal of the said fellowship." The less effective town business leaders eyed the big fellows, and all conspired to trim the foreigner as they agreed on the prices which were to be offered. In some instances the gild, through its officers, could make the first bid for the wholesale purchases of imported cargoes, which were then distributed among the gildsmen at retail prices.

The gild furthermore backed its members as they engaged in business dealings in "foreign towns." Supported by "tests," like modern letters of credit, the gildsman had a standing and an assurance of protection in his business dealings in other cities in England and abroad in a time when courts of law were broken reeds, and royal action in defense of an English merchant's rights was scarcely to be evoked. The gilds backed up their members in securing exemption from tolls to which they were entitled by terms of their town charter, and they enforced the immunity of their members from arrest for debts of fellow townsmen of which they were not sureties, unless their courts had refused justice to the creditors.

Everyone recognizes today the contrast between the producer and the consumer, even though in actuality everyone is both producer and consumer. In the medieval town the contrast was between the dealer and the consumer, and it was even more sharply phrased than at the present time. For as traders the townsmen were organized in the gild merchant, while as consumers they constituted the borough. While the identity of the two groups was not complete until the later Middle Ages, for practical purposes it existed at a very early date. It is therefore a little disconcerting at first to find the townsman as burgher legislating against himself

as gild member. The resolution of the dichotomy is to be found in part in the curious capability of the man of the Middle Ages to take different colorations under different corporate forms. As a burgher he recognized that the interests of the traders and of the town did not always coincide; the more so, since certain groups of traders earned, or at least achieved, a deep and general hatred by their peculiar practices. These were especially the millers, bakers, and brewers whom everyone cordially believed to be thoroughly dishonest. It will be recognized at once that these characters represent the victualing traders. In times of scarcity they raised their prices, at the very moment when such a move would be most unpopular. To keep prices as low as was compatible with the prices of grain was the object of the almost universal ordinances or assizes of bread and ale. From 1202 on municipal regulation of this sort was supplemented by royal legislation which was to be enforced in the town courts. Occasionally heavy penalties were imposed for violation of the town or royal assizes, but in certain cases where information is at hand it is evident that not all the fines imposed were collected and that not all offenders mended their ways.

The ideal of town policy in the matter of food supplies is summed up in the words of an ordinance of Chester, which was adopted to insure the sale "of good and wholesome victual at reasonable prices." And by reasonable prices is to be understood the just price, which gave to everyone who took part in the production of the goods a sufficient recompence to enable him to live according to his station in life. What did a middleman contribute to the growing of foodstuffs? Since the answer was nothing, it was perfectly obvious that it was wrong to tolerate any procedure by which a middleman added to the price by his devious manipulations. The town authorities dealt long and unsuccessfully with three particularly corrupt practices from which "the poor commons" suffered. These were engrossing, forestalling, and regrating. The engrosser purchased corn while it was standing in the field, or before it was even sowed, and then held it back from the market until its price rose. Forestallers bought goods on the way to market, to get them more cheaply. Regrators purchased commodities in the market and sold them again at a higher price.

In so far as the authorities did succeed in preventing the evil practices against which they issued so many prohibitions, they

merely discouraged the enforcement of qualities of prudence and foresight and thus accentuated shortage of supply in times of scarcity. It therefore became necessary for the town authorities to find a substitute for frugality enforced by the operations of the private trader, through the establishment of municipal granaries.

The whole set-up of the early medieval town was keyed to unchanging demand and small output. The market catered to by the average town businessman did not extend beyond the town limits. A static society was looked upon as the ideal. The accepted principle was that men belonged to certain classes. Everyone ought to try to stand well in his class or group, but the man who sought to increase his wealth unduly was condemned as guilty of avarice. Trade in so far as it was for gain only was wrong; but trade for gain to enable a man to support his station in life, for himself and his family, was justifiable. Thomas Aquinas said, "Trade is rendered lawful when the merchant seeks a moderate gain for the maintenance of his household, or for the relief of the indigent; and also when the trade is carried on for the public good in order that the country may be furnished with the necessities of life, and the gain is looked upon not as the object, but as the wages of his labor." The early town tried to give a man security in his station in life and to prevent him from interfering with anyone else's security.

The Craft Gilds

The gild merchant was a kind of *omnium gatherum* for all sorts of traders and craftsmen in the early towns. As long as there were only a few of each variety of dealers and a few of each variety of craftsmen there could scarcely be any other sort of economic organization. But with the increase of the number of men engaged either in buying and selling or in manufacturing certain kinds of goods, it often happened that little groups formed organizations of their own, perhaps at first religious, subsidiary to the larger gild merchants. The craft gilds came into existence in the thirteenth and fourteenth centuries, and eventually in town after town the single gild merchant was superseded by a whole series of craft organizations.

Most people carry about a conception of the medieval craftsman as essentially a man proud of his art and skill, producing only

the finest goods. Yet in actuality a far different state of affairs seems to have prevailed. Many medieval workers lacked the ordinary elements of honesty and on frequent occasions resorted to fraud and deception. "The medieval craftsman was not called a man of craft for nothing." There is, for example, the London baker who stole large portions of customers' dough under their eyes by means of a little trap door in the kneading board and a boy sitting under the counter. Pots and kettles were made of bad metal which melted when put on the fire. Cloth was stretched and strained to the utmost and then cunningly folded to hide its defects. Inferior leather was dressed to look like the best and sold at night to the unwary.

There was in the towns a strong public opinion in favor of protecting the consumer against defective workmanship. Occasionally, though not frequently, the men of a particular craft, finding that their craft was "badly put in slander" by the falsehood of some of its members, went to the town magistrates and asked for the appointment of authorized overseers or assayers. In more cases, the town authorities insisted that there should be adequate supervision or a "view" to maintain quality. From time to time general directions were issued by the municipal officials in some such form as the following London ordinance. "It is ordained that all the misteries (crafts) of the city of London shall be lawfully regulated and governed, each according to its nature in due manner, that so no knavery, false workmanship, or deceit shall be found in the said misteries for the honor of the good folk of the said misteries and for the common profit of the people. And in each mistery there shall be chosen and sworn four or six or more or less according as the mistery shall need; which persons so chosen and sworn shall have full power from the mayor well and lawfully to do and to perform the same." In the Bristol book of ordinances there is more particular notice to the effect that "diverse ordinances have been made on the working of woolen cloths to the intent that good and true cloth shall be made in the town as well for the preservation of the good fame of the same as for the profit which they shall take on the sale of their cloth."

The work of bringing all the workers in a particular trade under officers for supervision was made easy by the universal medieval practice of men in each line of business in a town to live together in a certain quarter or on the same street. They attended the

same parish church and had already often formed brotherhoods in the church to provide services for the dead or in commemoration of their patron saint. These religious fraternities assisted members in distress, lent money to their members, and took part in the pageants which were held on the great festivals of the church. Trade affairs at an early time quite naturally came up for discussion. Though at first such brotherhoods were prohibited by town governments on the ground that they might hurt the general body of consumers, toward the end of the thirteenth century these associations began to be recognized as useful organs for the maintenance of quality and were entrusted with power to search for articles of poor grade.

Another line of craft gild development was through the formation by royal charter, as early as the reigns of Henry I and Henry II, of trade associations among the weavers and fullers of woolen cloth, the bakers, and the cord wainers (shoemakers). In order to be free from the obligation of helping the towns meet their fiscal burdens and to monopolize their crafts these industrial groups sought charters from the king in return for rather high annual payments at the Exchequer. Probably because their charters exempted the gildsmen from local control, the town authorities were hostile to gilds of this kind and sometimes went so far as to offer the king higher payments for the withdrawal of the royal grants. At the beginning of the fourteenth century these gilds submitted to the town governments and became part of the general gild system.

In order to make the "view" of the craft officers cover the whole trade, it was requisite that all persons practicing the craft in question should belong to it. Thus there was a justification for the new organization's taking over in its own particular line a monopoly of business. It was a general rule that only freemen of the town could engage in a craft. As considerable numbers of craft gilds came into existence in a town, each exercising a monopoly over its own trade, the gild merchant disappeared.

During the fourteenth and fifteenth centuries the craft gilds maintained a very effective control over the various branches of industry found in their respective towns. Their rules embodied minute regulations of technical processes, such as those of the Bristol weavers which fixed the width of cloth and directed that if the threads were deficient in number or were too far apart, the

cloth and the loom on which it was made should be burnt. The London pewterers ordered as a penalty for bad workmanship that the craftsman should lose the defective ware, and that for repeated offenses he should be banished from the craft forever for having sullied the name of the craft. Night work was very generally forbidden, probably because poor workmanship at night might more easily escape detection. Wages of journeymen were frequently fixed by the craft guilds, particularly during the fifteenth century, and a number of efforts were made to fix prices of finished commodities. The London founders made gentlemen's agreements with one another regarding prices. The Norwich chandlers fixed prices and were fined. The London limeburners conspired not to sell lime below certain rates; their leaders were arrested, imprisoned, and deprived of their liberty. At Coventry the dyers fixed rates, and when a number of dyers refused to be bound by these rates the others hired Welsh and Irish to waylay and kill them.

As a corollary to craft monopoly was the principle of one man, one trade. "Every man should keep and occupy his own proper craft or occupation wherein he hath been brought up so that by their doing so everyone of them may live by the other." This statement is the correct expression of the medieval view of business. Each man was to be permitted to obtain a reasonable livelihood and a sufficient profit, and he was not to expand his own activities in such a way as to prevent other men from making a decent living. Yet such is the frailty of human nature that even during the Middle Ages there were those who neglected this limitation. They did so less through engaging in two crafts than in intensifying their own endeavors to the disadvantage of other craftsmen. In the world of medieval industry no efforts were more consistently put forth than those designed to prevent one craftsman from getting ahead of his fellows.

During the fourteenth century there was no limitation on the number of apprentices whom a master craftsman might take on as learners. Admission to the ranks of craftsmen was easy, and every apprentice could look forward to the time when, after a period as a journeyman, he would be able to open his own workshop. In the fifteenth century, however, the numbers of apprentices began to be limited. The founders of London forbade their members to employ more than two apprentices at once. The

tailors of Exeter were to employ not more than three servants and one apprentice without special permission. The leathersellers of London made members pay a fine for every apprentice they took on. Many other gilds had similar rules.

These limitations of apprentices are explicable on several grounds and point to several developments. In some instances the purpose was to protect the journeymen from the cheaper labor of the apprentices, so that the journeyman might increase his chance of employment. This was the case especially where there was a proportion established between the number of journeymen and apprentices. More generally, the masters were seeking to limit the number of those eventually entitled to go into business. At the same time they wanted to maintain a rough equality among themselves, which was one of the ideals of the gild. This they hoped to do by preventing the energetic and aggressive masters from becoming industrial capitalists, engaged in large scale operations employing many apprentices.

At the end of the fifteenth century the king's government began to intervene in this matter, an obvious indication that craft regulation had failed. Thus in 1497 worsted weavers were forbidden by statute to employ more than two apprentices at once. By earlier laws, incidentally, agriculture had been favored against industry in the matter of the choice of apprentices. Thus in 1388 no one who had been in "husbandry" to the age of twelve was to be apprenticed to any mistery. In 1406 a statute directed that no one was to put his son to apprenticeship in any city or borough unless he had land to the value or rent of twenty shillings a year at the least.

In spite of all that the gilds themselves and the Crown could do, great inequalities among the masters appeared. As the capitalist system in industry developed, those who operated their business along capitalist lines inevitably expanded. In some lines the members of terminal crafts, that is, those which purchased raw materials or sold finished products, got control of the artisan gilds which were then amalgamated with the mercantile group. Thus as early as 1327 the joiners, painters, lorimers, and saddlers were grouped together. The true craftsmen still worked in their own shops, but they sold exclusively to the merchant saddlers. In other crafts there was a distinction between the capitalist gilds-

men "in the livery," who wore the full regalia of the gild, and the smaller masters "out of the livery."

This development represents the rise in the industrial field of capitalist masters who by their aggressiveness and ability had accumulated sufficient capital and were sufficiently acquainted with their sources of raw material and with their markets to organize production on a larger scale than was usual. As the area served by the town as a market grew larger it was difficult for the masters engaged in the actual manufacture of goods to keep up with the problems involved in securing raw materials or in making contacts with their customers. Certain groups of masters took over purchase of supplies or marketing and devised arrangements by which the craftsmen actually engaged in producing wares virtually worked for them.

With the rise of the mercantile masters there was a corresponding increase in the ranks of those who were permanent wage earners. Mastership was no longer open to all who entered the gild, for many journeymen who "had sufficient cunning and understanding in the occupation and exercise of their craft" yet lacked the means "to occupy the craft to their own proper use, increase and advantage." In other words, as industry became capitalistic many journeymen never became masters. One of the first manifestations of this trend was the appearance during the second half of the fourteenth century of "yeomen companies" or guilds of journeymen organized both to oppose the new capitalist economy and to get higher wages. They demanded that the masters cease the efforts which prevented journeymen from becoming masters, and they struck for better working conditions. They even manhandled fellow journeymen for refusing to join their "conspiracies." In 1389 the Founders Gild invented the lockout as a retaliatory measure against the journeymen.

The apogee of capitalist development within the shell of the craft gild was reached among the London companies. Parliament, in 1363, had solemnly enacted into law the rule that one man should practice one trade. On pretext of enforcing this statute King Edward III, in the summer of 1364, began to issue charters to various wealthy bodies of merchant guildsmen, such as the vintners, the fishmongers, and the drapers of London, authorizing them to regulate and monopolize their own callings. The joker in the grant was the recognition of the function of

superintendence as a separate calling; the "making" of cloth was a separate trade confined to the drapers of London. The weavers, fullers, and dyers must limit themselves to weaving, fulling and dyeing, and must sell to the draper or work for him. In this way the controlling position in English industry, already being established by a group of mercantile crafts, was recognized and encouraged by the central government. In 1363 the vintners obtained a monopoly of the wine trade with Gascony to the extent that they alone might sell wine at retail and alone might export the cloth used to make payment for wine imports; but the Gascon merchants retained the right to sell wine at wholesale. The fishmongers, the third company chartered at this time, obtained the monopoly of the retail trade in fish, but anyone could sell fish at wholesale to anyone for his own use. Before long the rule was adopted that if anyone were admitted to freedom of the city in some mystery he might transfer to another and that he might trade at wholesale in any kind of merchandise, but at retail only in his own. In actual practice many qualifications must be made to this statement, depending on differences between guilds and between the articles which they made or dealt in. It is not surprising that during the next century the government of the capital was actually turned over to the twelve great livery companies.

The craft guild provided a means of controlling quality in the interests of the consumer, of maintaining monopoly for the advantage of the producer, and of stabilizing production against the excessive enterprise or greed of some over-efficient guildsmen. In connection with the craft guild there developed a system of education for the transmission and improvement of industrial skills, known as apprenticeship. The institution is found as early as 1260. By 1300 it was common in the London guilds, and it spread rapidly in every English town. There is reason for believing that not every man who was employed in a craft had been an apprentice to a master, but, as the fourteenth century went on, the tendency was to insist upon apprenticeship as a prerequisite for admission into mastership in the craft. The apprentice frequently paid a premium to the master and he might even pay extra for bed and board. The master provided technical training and "whatever is needful for an apprentice." This included pocket money—eight pence a year in one instance, clothing, admonition, and chastisement. In spite of the generous administration of the

latter, apprentices were an unruly group and frequently set the whole town by the ears with their brawls and riots. Though there was at first no fixed length of apprenticeship, the London term soon became established as seven years, and this period of training became general throughout England. The age at which a boy entered his apprenticeship generally was somewhere between fourteen and nineteen. In the reign of Elizabeth it was believed that a man could not have mastered his craft before he was twenty-three, and in London apprentices were not permitted to finish their training until they attained to the dignity of their twenty-fourth birthdays.

After a man had served his apprenticeship, he became a journeyman and sought employment as a hired worker. Sometimes journeymen were required to serve in this capacity for at least three years before seeking the mastership, "to the intent that they may have something of their own." During the period of journeymanhood, the craftsman was expected to make a piece of especially fine work to be shown to the wardens of his craft when he applied for admission to the mastership. This was the "master-piece" and formed part of the examination which showed his competence. In the heyday of the craft system the journeyman, once admitted to full standing in his craft, set up as an independent master; but even during the fifteenth century many journeymen remained journeymen all their lives.

The articles which medieval craftsmen made are to be learned from the names of the guilds. There were cordwainers and cobblers who made and repaired shoes respectively. The pewterers, carpenters, saddlers, bowers, spurriers, pouchmakers, barbers, ironmongers, founders, coopers, cutlers, goldsmiths, hatters, candle-makers, cardmakers, and leather tanners worked in articles sufficiently indicated by their names. A whole series of crafts dealt with the production of textiles and their manufacture into clothes. The weavers, fullers, shearmen, and dyers performed various operations in making woolen cloth; the drapers dealt in cloth; the tailors cut the cloth and sewed it together into garments. The victualing crafts such as the fishmongers, grocers, vintners, and bakers played an important part in every town. In some places there seem to have been more people concerned with the handling and preparation of food than there were in any other line of work. Cooks and bakers were particularly numerous.

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MEDIEVAL TRADE

MEDIEVAL commerce was but small in volume by modern standards; and, indeed, in the earlier medieval centuries it was a mere trickle. London regarded Bristol as a foreign port, and foreign trade was as apt to be carried on overland as overseas.

The earliest merchants seem to have been merely peddlers, carrying all their wares on their backs. Yet certain kinds of bulky commodities were also dealt in. Thus, during the twelfth century, when the choir of the Norman cathedral at Canterbury was burned down (1174), the present structure was built by William of Sens of great stones quarried and dressed at Caen and shipped across the English Channel. Wine came in huge tuns from Bordeaux. Nevertheless there are many reasons for believing that it was not until the thirteenth century that commerce in general began to increase in magnitude. It was in this century that money first appeared in sufficient volume to be used freely in commercial transactions. In 1257 Henry III coined the first English gold coin, the gold penny, current for 20 silver pence. Yet this coinage was not continued, possibly because there was not sufficient commercial activity to demand it, and the coinage of gold was not renewed until 1337, in the reign of Edward III. Two years later complaint was made in Parliament of the want of coinage sufficient for the business transactions of the day. The first great expansion of commerce perhaps took place between 1257 and 1337.

A good deal is said in the history of Europe about the significance of the Crusades in bringing about the revival of commerce. Unquestionably the contacts with new places and the acquaintance with new commodities which the knights of the Cross made during their journeys to and from the Holy Land changed fashions and habits of consumption in Europe. The reopening of rela-

tionships between the eastern and western empires which the Crusades brought about had decided reactions on European commercial activity. For England, however, the series of wars which Edward I began with Scotland and France had perhaps greater importance. For they led directly to the accumulation of large capital sums, garnered in by war taxes, in the hands of money lenders, contractors for soldiers, grain dealers, and politicians who did not hesitate to spend their new-found wealth for all sorts of luxury wares. Even the common soldier learned something of foreign fashions during his campaigns in France, and many a French wardrobe was plundered to provide fine garments and dresses for English matrons. So extravagant did the English people become in their clothing and personal adornment that in 1363 Parliament legislated against excessive apparel.

Owing to "the outrageous and excessive apparel of divers people against their estate and degree to the great destruction and impoverishment of all the land," certain rules were laid down, such as the prohibition of servants from wearing cloth of a greater value than two marks for the entire dress or adorning themselves with gold or silver or silk. Yet a generation later, during the reign of Richard II, it was stated that, "The commons were besotted in excess apparel, some in wide surcoats reaching to their loins, some in a garment reaching to their heels close before and strutting out at the sides, so that at the back they make men look like women and this they called by a ridiculous name, 'gown.' Their hoods are little, tied under the chin and buttoned like the women's, but set with gold, silver, or precious stones. Their liripipes or tippets pass around the neck and, hanging down before, reach to the heel, all jagged. . . . Their hose are of two colors . . . their girdles are of gold and silver, and some of them worth twenty marks." The poet Langland thought that if the lords would drive away the "dagged" (slashed) clothes and Dutch coats and reprove robbers and choose more worthy men, the world would amend.

The demand for fine clothes, luxurious furniture in house and castle, glass windows, costly hangings of tapestry, and rich wines provided some of the incentives to merchants to increase their operations, just as the new fashions which the merchants offered stimulated demand. Another incentive to commerce was the fact

that fish, tin, wheat, wool, and hides could be purchased cheaply in England and sold at high profit abroad.

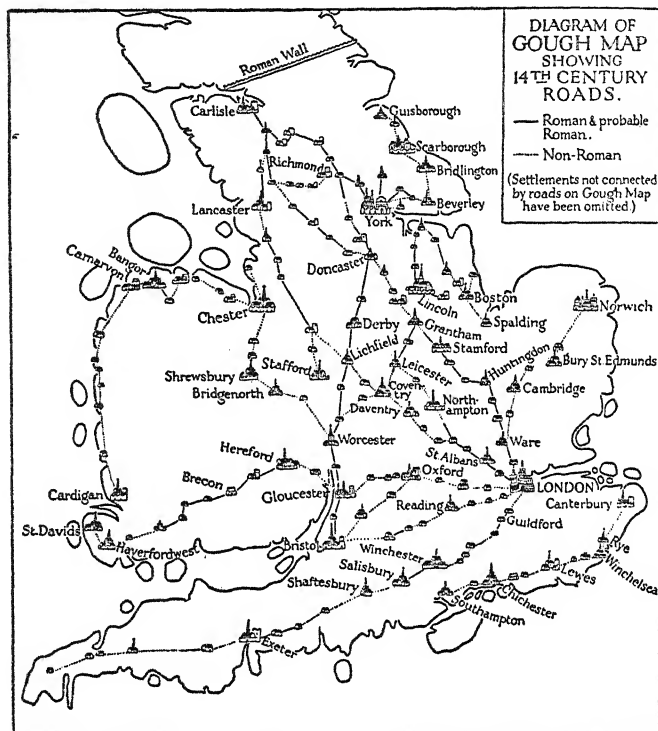
In earlier centuries, before the reign of Edward III, most merchants did their business at the great fairs, where the barons, bishops, monasteries, and colleges purchased at wholesale their supplies of such things, from barrels of salted fish to furs, as they could not produce on their own estates. As the towns increased in population and wealth and as they began to specialize in the manufacture of certain wares, such as various kinds of woolen cloth, leather, or parchment, they began to be preferred to fairs by merchants. Even though the "foreign" businessman from another town was subject to tolls which the citizen did not pay, could sell only at wholesale, could not deal with other foreigners, could remain in a town only forty days, and had to lodge with a "host" who kept track of his comings and goings, towns grew rapidly as centers of commerce during the latter part of the thirteenth and during the fourteenth century.

Internal Commerce

From what has just been said it is obvious that when a medieval Englishman thought about "commerce" he thought first of all of internal trade, between different English towns and districts. Production was already sufficiently specialized in different areas by the thirteenth and fourteenth centuries to lead to a very active shipment of grain, salt, coal, cloth, iron, tin, stone, and fish from one district in England to another. A large volume of these goods was carried by water, either along the coast by sea, or up and down the English rivers. Water transport was cheap, but it was subject to certain dangers and disadvantages. On the rivers, for example, there were frequent fish-traps or weirs which obstructed navigation.

Road transport was thus often preferred in spite of its expense. Goods were carried by pack-horse and, in the case of bulky articles sent long distances, by carts and wagons. By the first half of the fourteenth century, as is made evident by a contemporary map known as the "Gough map," England and Wales were covered with a network of roads. Some of these followed the Roman roads, but many represented later additions. London was the principal focus of the system with a secondary focus at Coventry.

Some of the great trunk routes were combinations of Roman survivals and medieval additions. Scarcely any part of the country was far enough from one of the great roads or rivers of the day as to be considered isolated. By pack-horse, barge, or cart supplies could be moved about the country with comparative ease.



In some regions quite complicated systems of collecting centers grew up. Thus, in the case of wool transported to the east coast ports, Hull, Boston, and London represented the primary centers where the wool might be purchased for use at home or export abroad. From Worcester, a secondary center, wool was brought to London by cart. From Northampton and Oundle it was carried to Boston by cart. From Shrewsbury it was carried by cart to Nottingham, whence it was shipped in barges down the Trent and Humber to Hull. The existence of these different collecting centers implies the presence of a complicated group of buyers and dealers, using various kinds of credit operations to

finance their undertakings. The internal corn trade was likewise highly elaborated, and depended upon an even more complicated system of transport arrangements. As the large cities grew the problem of obtaining steady supplies of grain, meat, and fish to feed their people became very important. This was especially true of London, in connection with which an elaborate system of agents and transportation arrangements for bringing grain to the city was developed.

Foreign Commerce

Foreign commerce was subject to physical hazards and dangers of many kinds. Ocean currents, storms, fogs, unmarked rocks and unlit headlands took a constant toll. Pirates infested the English Channel and the North Sea. Ships were small and not easily managed. Down to 1200 they averaged 30 tons (a ton is roughly 100 cubic feet of space); during the thirteenth century vessels of 100 tons were occasionally mentioned and it was not until the fifteenth century that larger vessels appeared. Stern rudders first appeared in 1328; they did not become common until much later. Pumps were not used before 1300. Courses were set from headland to headland, until the fifteenth century when the compass was perfected sufficiently to be practical. During the fourteenth and fifteenth centuries the sails and rigging were improved, so that ships could sail closer to the wind and were no longer compelled to wait for following breezes.

From a geographical point of view, for purposes of foreign trade medieval England was not a single nation but a group of districts each dominated by a great seaport, such as Bristol, Southampton, London, or Hull. The nature and scope of her foreign commerce may perhaps best be understood by studying in some detail the business of some of these ports. Southampton was the port of the Hampshire basin. Behind it lay the industrial cities of Winchester and Salisbury and the wool-growing areas of southern England. Along the coast lay the subsidiary ports which served as secondary centers for collecting and distributing the wares carried through Southampton itself. From the earliest periods Southampton was so busy with commerce that it never became an industrial town except for its shipyards. To the city was brought the fine wool of the Cotswolds, so much sought by the

Italian merchants who carried it in their own ships to Venice. From other districts came the coarser wools which found a market in France, together with hides, tin, lead and pewter. When English cloth manufacture expanded in the second half of the fourteenth century the cloth made in Winchester and Salisbury, in so far as it was not sold in England itself, was exported through Southampton to be sold in France. In return Southampton imported wines, chiefly from Bordeaux, and fine manufactured wares, apparel of silk, velvet, gold cloth, and damask, furred gowns, fruits such as dates, figs, and raisins, spices, olive oil, and woad from the Italians who thronged the port. Sweet wines from Spain and the Mediterranean were also important imports. These goods were in large part re-exported by sea or sent overland either to the outlying ports of the southern coast which had transhipped the wool, cloth, lead, tin, and fish consigned to the city, to other parts of England, or even to the continent. The trade of this sort between Southampton and the ports of Devon and Cornwall was particularly brisk.

The Trade of Bristol

Interesting details of trade, the names of merchants, the sizes of their ships, the countries they visited, and the varied goods other than wool, cloth, and wine that they dealt in, are brought out in a survey of the trade of Bristol.

Next to London, Bristol was England's greatest port. The city was situated at the junction of the Avon and the Frome, seven miles from Bristol Channel, safe from piratical depredations. The old town was surrounded by a wall, but by the close of the fourteenth century there were already new quarters in all directions outside the walls. Across the Avon from the old city, sheltered in a curve of the river, there was a large quarter where the manufacture of cloth was briskly carried on. Its Weavers' Hall, Weavers' Chapel, and Touker Street sufficiently attested the character of its inhabitants, and the great mansions fronting the river indicated the prosperity of the merchants who dealt in cloth.

A large part of Bristol's commerce was with her own hinterland, the country from which all sorts of wool, iron, timber, cloth, hides, cattle, and grain came down the Avon and Severn rivers to her markets. From Devon and Cornwall by way of Bristol Channel

came tin and great quantities of fish for home consumption. A boat from Wales might bring fish and take back grain. Coal, wax, iron, fruit, and wine would be sent back up the Severn to Gloucester. Bristol purchased great quantities of cloth from the up-country villages at the foot of the Cotswold and Mendip Hills and from those in Somersetshire, sending in return woad for dyeing, alum, wax, and bells for their lovely parish churches.

Bristol carried on trade also with London and Southampton. Cloth intended for the Italian galleys was sent to Southampton, and much cloth was sent to London to be exported by the Hansards. The overland journey to the capital could be accomplished in three days.

From the great freestone bound wharves of the city ships sailed to Ireland, Bayonne and Bordeaux, and Lisbon along the three main lines of the city's overseas commerce. The trade with the southern Irish ports was particularly dominated by Bristol. Curiously enough, in this trade Irish ships were more in evidence than Bristol ships, since these were more apt to seek the more distant continental ports. There is some evidence that as a result of the traffic with Ireland, Irishmen began to settle in Bristol, to the great offense of the townsmen. The chief importations from Ireland were herring, salmon, hides, pelts (furs), timber, linen, and linen yarn. In return the Irish purchased two commodities, iron and salt to cure their fish.

It has been said that Bristol's prosperity was based largely on the wine trade, and her connection with Bayonne and Bordeaux originated in that trade. In 1410 about 200 ships left Bordeaux with wine. Of these nine were Bristol ships; but many others brought their cargoes to the city. But from the country around Bayonne and Bordeaux came also woad, used as a blue dye for dyeing woollen cloth, alum, linen, wax, and honey. The Gascons who produced these goods needed in return cloth, fish, and grain. Of these goods cloth was supplied in especially large amounts by Bristol. Indeed many Bristol ships carried nothing but cloth to Gascony. Others might carry a few hides, and a little fish and grain, but cloth was still the chief part of their cargoes. This valuable trade between Gascony and Bristol was interrupted, as was the Gascon trade with the rest of England, when Bordeaux was lost to English rule in 1453. Ten years later trade was reopened on a limited basis, and in 1475, by the Treaty of Pic-

quigny, it was restored to its former greatness by the removal of nearly all restrictions.

From Portugal and Spain came the sweet wines which were beginning to be popular among the rich in England. Figs and raisins, honey, almonds, licorice, and saffron—commodities whose increasing use is one proof of better cooking during the fifteenth century—vinegar, lard, tunny-fish, and rice were other Spanish and Portuguese products. After the fruit- and wine-shipping season was over, ships might bring iron and iron goods, such as cross bows, nails, and combs (for wool-combing). From southern Spain came oil, castile soap, wax, rosin, tar, and cork. Cordova leather, skins, woad, alum, scarlet dye, and salt were other products of the Iberian peninsula which were in demand in England. In return the Bristol merchant sold the Spaniards cloth almost exclusively, particularly ungrained broadcloth. Bristol ships occasionally carried wheat and beans, and many of them engaged in the business of transporting pilgrims to the shrine of Santiago (St. James) of Compostella.

To the Bristol merchant Spain meant Castile. He never ventured as far east as Valencia, Aragon, or Catalonia. Yet the more distant shores of Italy were not beyond his ken. In 1446 Robert Sturmy, a merchant of Bristol, consigned to Pisa the *Cog Anne* with a crew of 37 men. She carried a cargo of 13 tons of cloth and tin and had a passenger list of 160 pilgrims. Actually she landed her pilgrims at Joppa, and her owner intended that she should procure some spices in the eastern Mediterranean. On her return she was wrecked with the loss of all her crew. Again in 1457 he obtained a license to ship 100 fother of lead, 10,000 pieces of tin, 600 sarplers of wool, 6000 pieces of cloth, and other commodities to Mediterranean ports. His ship, the *Katherine Sturmy*, safely entered the Mediterranean and perhaps even tapped the spice markets of the Levant. But according to Fabyan's chronicle, the Genoese, hearing of his venture, were determined not to permit him to reach home with his valuable spices and still more valuable knowledge of where they were to be purchased without Italian intermediaries. So the Genoese lay in wait for Sturmy near Malta and despoiled his ship. The Genoese in London were arrested for this deed and compelled to pay £6,000 damages. It is not until after the advent of the Tudors that further informa-

tion is at hand concerning English trading ventures into the Mediterranean.

Among the merchants of Bristol the greatest were those of the Canynges family. In 1396 William Canynges died, leaving his ship *Rodecog* to his son Simon and the rest of his property to his son John. John Canynges dealt in cloth, shipping it to Spain and Portugal in exchange for salt and iron. At his death in 1405 he owned 3 halls, 5 gardens, 6 tenements, 22 shops, and other property. His son, William Canynges, sent his ships to Iceland, the Baltic, Spain and Portugal, France, and the Netherlands. He was lord mayor of Bristol five times, owned 10 ships of 2854 tons, and employed 800 sailors and 100 workmen, carpenters, and masons. So great was his wealth that he was able to "restore" or complete the great church of St. Mary Redcliffe in beauty and splendor, and this and other civic activities earned for him the title: *Renovator et quasi alter fundator ac inter ceteros specialissimus benefactor ecclesie de Redclif*.

At this time Bristol possessed at least 20 ships, and there were perhaps as many outside ships engaged in the city's commerce. Canynges thus controlled about a fourth of the city's shipping, and his wealth was amassed less by dealing in wares than by carrying goods as freight for other merchants in his ships. Freight rates were high and lucrative—£1 per tun on wine from Lisbon to Bristol. In one year alone Canynges may have received as much as £10,000 in freights if all his ships were busy, but of course this was not all profit.

In a similar way commerce of the east coast ports such as London, Boston, and Hull might be examined. It would be found that their trade was larger in volume than that of Southampton or Bristol; it was directed toward western and northern Europe with a shorter overseas haul, it tapped richer resources, and it dealt in goods of a more general nature. During the middle of the fourteenth century, for example, while 10 per cent of the wool exported went through Southampton, 80 per cent of it went through London (41 per cent of the total), Boston (21 per cent), and Hull (16 per cent). Perhaps because of the potential value of the east coast trade, together with the geographical propinquity of the seat of the government to its principal center (London), it early became a matter of interest to the Crown and was an important element in the formation of a national trade policy.

Medieval Commercial Policy

Foreign commerce had not begun to increase very long before the king's government saw in it the possibilities of a revenue for the Crown. In 1275 Edward I levied the first national customs duties of one-half mark (6s. 8d.) on every sack of wool and one mark (13s. 4d.) on every last of hides exported. In exchange he issued police regulations to make the passage of merchants from town to town safer (Statute of Winchester); he lessened the harshness of the strand laws by providing that if any man, or even a cat or dog, remained alive on a stranded ship, it should not be accounted a wreck (Statute of Westminster I); and he fostered a national system for the recovery of debts (Statute of Acton Burnell). These regulations, in tune with the earlier national assizes of measures, cloth, ale, and bread of the time of Richard I and Henry III, made the nation rather than the town the economic unit, and began the disintegration of the intense localism of the municipalities. In 1303 Edward levied a new customs duty. Though the native English merchants refused to pay this exaction, the alien merchants were forced to do so, yielding their consent in return for important concessions. These, embodied in the *Carta Mercatoria*, provided that while alien merchants must still sell only at wholesale, they could deal with each other, need not go to host, and might stay as long as they pleased. It began to look as though, in connection with the royal need for money, there would be introduced a system of national commercial regulation based on equality between the native trader and the alien merchant. The *Carta Mercatoria* of 1303 was in line with Edward I's earlier attitude toward the alien merchants. The native English businessmen raised terrific opposition, as when the London vintners resisted certain claims raised by the Gascon wine merchants. During the period from 1310 to 1322 and again in 1327 the *Carta Mercatoria* was actually suspended, but the trend toward greater freedom for alien merchants continued. The king and the nobles were interested in plenty and cheapness and were thus led for a time to resist the pretensions of the towns. In 1335 the Parliament protested against the restrictions which were being enforced against foreign merchants, declaring that "such stuff aforesaid is sold to the King and his people . . . more dearly

than they should be, if such merchant strangers might freely sell them to whom they would." In the ensuing statute full freedom of traffic was conferred on aliens to trade at wholesale with whom they would. London was almost immediately safeguarded from the effects of this law, with the result that it had little importance. In 1351 a new statute gave aliens freedom to sell at retail. The policy permitting alien merchants to trade on the same basis as Englishmen was backed by the nobles and landowners, who saw in it a pledge of lower prices for what they purchased and higher prices for the grain and wool which they had for sale.

Yet at the very moment when there might have been established permanently in England a policy of equality for all merchants in English commerce, the financial needs of the Crown created by the Hundred Years' War made it difficult for the king to follow his "free trade" policy consistently. In 1367 Edward III had to rescind the right of the foreigners to trade at retail and nine years later, in the Good Parliament of 1376, the merchants of London gained a new charter for the city, leaving their monopoly intact.

During the reign of Richard II bitter city strife between the victualing and non-victualing guilds in London assumed national significance. The victualing guilds, such as those of the fishmongers and vintners, were especially hostile to the alien dealers, while the non-victualing guilds, such as those of the goldsmiths, having less fear of foreign competition, were free traders. The victualers lent money to the king and secured his support; the non-victualers attached themselves to John of Gaunt. In the ups and downs of factional struggle national policy fluctuated. In 1390 a new note was sounded in a petition urging that alien merchants should be treated in England as English merchants were "used" abroad. In 1404 Henry IV adopted this principle in the enactment that alien merchants should be subjected to the same restrictions in England as Englishmen received abroad. They were forbidden to sell merchandise to one another, were to sell their wares within three months, and spend the money they received from the sale of their goods in purchasing native English commodities.

In actual fact the restrictions upon aliens seem to have been unenforced by the Crown during the fifteenth century, and numerous complaints were raised against the attitude of the king. Moreover, the restrictions themselves were lightened in new statutes.

Thus, while hosting was legally continued, even though only occasionally enforced, the time that an alien merchant might remain to sell his goods was extended to eight months in 1439. Perhaps more important from the alien merchant's point of view than laws imposing restrictions upon his activities was the hostile attitude of the English public in times of depression or excitement. In 1359 the Lombards and other aliens in London and in other cities were roughly handled. In 1381, during the Peasants' Revolt, many aliens in London "lost their heads at that time, and namely because they could not say Bread and Cheese but Brod and Case." Other riots took place in 1456 and 1457; and again in 1517, on Evil May Day, at a time of business depression, the London apprentices rioted against aliens in the capital. Aliens paid heavier taxes than native Englishmen and, except for the Hanse merchants, were subjected to heavier customs duties. They were also occasionally harassed by the sporadic attempts of the Crown to prevent them from exporting money. Yet they thrive on the whole and took part in civic and national movements. They participated in pageants and processions and stood in high regard both in the political and business world. During the reign of Henry VII, at the very end of the fifteenth century, the greatest merchants in England were Italians and Dutchmen, and Italians and Dutchmen continued to play an important part in English business all through the next century and more.

The Italian and Hanseatic Merchants

Two groups of foreign merchants had an especially interesting position in England during the Middle Ages. These were the Italians and the merchants of the Hanseatic League. During the thirteenth century English cloth and wool went to Italy overland across France, but in 1317 the Venetian Senate dispatched a state galley to Flanders and England to carry the Venetian merchants and their cargoes to and from the northern countries. These Flanders galleys continued to be sent at intervals down to 1532, bringing currants, wines, and spices and carrying home wool and cloth. Genoa and Florence likewise sent galleys to England during the fourteenth and fifteenth centuries.

Merchants of German cities came to London even before the Norman Conquest. In the year 1157 Henry II took the mer-

chants of Cologne under his special protection. These merchants owned a house or gildhall in London. During the thirteenth century merchants from other German cities were granted privileges; and, as these cities united more closely into the Hanseatic League, their merchants abroad increased their rights and privileges by additional grants from the rulers of the countries in which they traded. Among the most valuable concessions granted to them in England were preferential customs duties under which they paid at a lower rate even than native English merchants. The export duty on a dyed cloth, for example, paid by an English merchant was 28d. The Hansard merchant paid 24d., and other alien merchants, 78d. There were Hanseatic houses in Boston and Lynn, but their chief depot was in London. It was known as the Steelyard and stood on the site of the present Cannon Street Railway Station. It was surrounded by a wall, had its own wharf on the Thames, and contained residential and warehousing accommodations. The Steelyard was occupied by the Hansards as early as 1320, but they did not become the actual owners until 1475. Their successors finally sold it in 1852. The Hansards living here were governed by an alderman and his assistants, who ruled them according to merchant law. These German merchants virtually monopolized the trade between England and the Baltic countries; it was not until the middle of the sixteenth century that they were effectively challenged in their domination.

English Merchants Abroad

Just as royal fiscal needs played a part in shaping national policy in regard to the alien merchants in England, so they likewise influenced the attitude of the Crown toward English merchants trading abroad. Edward I constantly negotiated with the estate of the merchants whenever he required consent to new customs. It is possibly because the English merchants came together to deal with the king that they formed an association with a depot abroad to make trade easier and more profitable for themselves. They may have had such a depot or staple for wool as early as 1266. In 1285 a wool staple was set up at Dortrecht; later it was removed to Bruges and then to Antwerp. In 1297 Edward I ordained that no wool should be exported except from certain English "staple towns," where collectors of customs were located.

Edward's purpose was purely fiscal, but the regulation perhaps made for closer integration of the group which was exporting wool. In 1313 an ordinance known as the Ordinance of the Staple was issued which directed that "the mayor and the commonalty of the merchants" should set up abroad a staple to which all wool should be shipped. Under this regulation voluntary arrangements hitherto in existence assumed a compulsory character, which was enforced by the mayor and council of the merchants against native and alien merchants alike. The merchants interested in the wool trade seem to have used the ordinance as a charter for their own monopolization of the export trade in wool; and they defended their new claim vigorously against all alien and other native merchants.

Edward III continued to cooperate with syndicates of wool merchants. They manipulated the wool market to their own advantage and in various ways shared their profits with the king. In 1363 the wool staple was established at Calais. To this staple all wool exported from England was to be sent, and a practical monopoly of wool export was placed in the hands of 45 of the greater east-coast merchants. Although the staple was for brief periods moved from Calais either to other continental towns or to England, in 1391 it became permanently established at Calais and remained there until Calais ceased to be English in 1558. The monopoly of the export of wool, woollfells, and leather, with certain exceptions in favor of the merchants of Newcastle and Southampton and of Genoa, Venice, and Spain, remained the possession of the company of the Merchants of the Staple even longer.

Long before the monopoly of the Merchant Staplers ceased, wool had become an unimportant English export. In the fourteenth century the manufacture of cloth developed rapidly in England, and unfinished English cloth found a ready market abroad. As the export of English cloth became important, groups of merchants tried to establish control over its sale in certain export markets.

The Merchant Adventurers

English merchants trading to the Low Countries during the thirteenth century were part of the general group of the merchants

of the realm in which the Merchants of the Staple were also comprehended. Their special attention to the Low Countries drew them together, and at some early date they formed a gild known as the Fraternity of St. Thomas of Canterbury. Through their association they seem to have acquired a privileged position in the Netherlands. In 1296 and 1305 they received charters from the Duke of Brabant which indicate that they already had a high degree of organization. By 1360 they were an organized company under the rule of a mayor. In 1407 Henry IV granted the merchants trading in the Netherlands a charter regulating their activities. In similar fashion two other groups of merchants, those trading to Scandinavia and to Germany, were chartered at about the same time.

During the fifteenth century, as the trade with the Netherlands came to overshadow that with other parts of northwestern Europe, the merchant adventurers trading in the Netherlands eclipsed the other merchant adventurers in importance. By the charter of 1407, the merchants trading in the Netherlands from such towns as Hull, York, Bristol, Newcastle, and Exeter, who already had their own organizations in England, carried on their trade in the cities of the Netherlands subject to their local regulations, with governors ruling them while they were abroad. The London merchants, who were more numerous and more important than those of the provincial ports, were members of the guilds of the grocers, drapers, haberdashers, skimmers, tailors, fishmongers, and mercers. As early as 1456 the mercers trading in the Netherlands began to hold meetings apart from the rest of the Mercers' Company; and in subsequent years similar groups in other companies did likewise. The next step, during Edward IV's and Richard III's reigns, was to hold common meetings of all such London merchants trading in the Netherlands to deal with common interests, and in 1486 a formal union of these London groups with a set of officers was organized by the authorities of the City of London. The adventurers who were members of the Mercers' Company dominated the London organization, and since the London court had no place of meeting of its own, it met in the Mercers' Hall. Down to 1526 it even kept its records in the account books of the Mercers' Company.

The London court was soon involved in great expenses for convoy and other matters and took the stand that all English mer-

chants trading in the Netherlands should contribute toward their charges. The merchants of the northern towns, such as Newcastle and York, claimed exemption from any control by the London group, since they had their own governor. This they held was in accordance with the charter of 1407 which provided for governors and not a single governor for the English in the Low Countries.

In 1495 Henry VII negotiated a new trade treaty with the Duke of Burgundy, ruler of the Netherlands. When Pykering left England as governor of the Merchant Adventurers' fellowship in the Netherlands, he carried a letter from Henry VII which made references to a unified organization of all English merchants there. The northerners still resisted, on the ground that the entrance fees charged by the company were excessive, but when a statute in 1497 reduced the maximum fee chargeable to 10 marks, the northerners submitted. A new charter of 1505 provided there should be one governor for the Merchant Adventurers in the Low Countries with a court of twenty-four assistants. Some of the assistants were chosen from among the northern merchants, but the London court dominated the new organization.

The Merchant Adventurers were a regulated company, open to all who paid the entrance fee and accepted its authority. Its members traded on their own account, but under such regulations as kept prices high and profit large. The company, for example, chartered vessels for the use of members and arranged convoys for protection against pirates. The Crown used the company to make certain that export dues had been paid by its members and frequently borrowed money from it. The foreign rulers fostered the organization because it gave them a responsible authority with which to deal in matters of trade policy. The Merchants of the Staple were unhesitatingly excluded from the cloth trade when their own wool trade began to dwindle. With the Hanseatic merchants in London and with the Hanseatic League itself the Merchant Adventurers carried on a struggle which lasted for two centuries. The Merchant Adventurers sought free entry into Hanseatic territory and aimed to reduce the rights of the Hanseatic merchants in London. In this conflict repeated agreements were made only to be broken. Thus in 1473, after the Hanseatic merchants had aided Edward IV to recover his crown, the treaty of Utrecht was made. It restored all Hansard privileges in London which had been abrogated, on the understanding that

English merchants might freely enter Hanseatic territory. Actually they were not permitted to do so; it was not until the reign of Elizabeth that the Merchant Adventurers were trading freely in Germany. Edward VI had already suspended the Hanse privileges; Mary restored them, but Elizabeth again revoked them.

English Trade in the Fifteenth Century

With the opening of the fifteenth century it is possible to speak with a good deal more definiteness about the nature and volume of English trade than can be done for earlier times. Exceptionally good analyses of the volume and nature of commerce are available for the years from 1446 to 1482. These show that by the year 1446 the export of wool, once the most important item in England's foreign commerce, had declined greatly as compared with the past. The normal export was about 8000 sacks as against 32,000 sacks at the beginning of the reign of Edward III, a hundred years and more earlier. In part this decline may have been due to the effects of civil and international wars upon sheep-raising and upon commerce. Yet after 1446 the wool trade shows but little effect from the disturbed conditions of the times, and it is entirely possible that there is some other explanation for the decline in wool exports in the century before 1446. Some of the wool which ceased to be exported was made into cloth at home, and as the export of wool fell, the export of cloth rose. In the years 1437-1440 the average export was 56,000 broadcloths; but even so the decline in wool exports represented more wool than was used in the additional cloths exported.

In 1446 about four-fifths of the wool trade was controlled by native merchants, chiefly the Merchants of the Staple, and one-fifth by foreign merchants. The Italians shipped 1000 sacks a year, and 66 sacks additional, nominally shipped by native merchants, were carried on their galleys to Italy. The Burgesses of Newcastle shipped 500 sacks a year to Bruges and Middleburgh. The rest of the wool exported went to Calais, the staple town. On the assumption that native merchants paid £9 per sack for their wool, including the export duty, and foreign merchants, £9 13s. 4d., the annual investment in the wool trade was £57,600 by the native merchants exporting 6400 sacks, and £15,500 by foreign merchants exporting 1600 sacks.

The export of cloth amounted in 1446 to 53,700 broadcloths, averaging in value, after export duties were paid, £2 per cloth for those exported by native and Hanse merchants and £2 10s. for those exported by other foreigners. Of this trade 21 per cent was in the hands of the Hanseatic merchants, and 24 per cent in the hands of other foreigners.

The export trade in cloth represented an investment of £61,800 a year by native merchants, £23,900 a year by Hanseatic merchants, and £33,700 by other aliens. Already the Merchant Adventurers, who dealt in cloth, had more money invested in England's commerce than the Staplers, who dealt in wool.

The third important commodity of English commerce in 1446 was wine. Native and foreign merchants imported 10,234 tuns of red wine a year at this time, and alien merchants, 766 tuns of sweet wine. (A tun equals 4 hogsheads of 63 gallons each or 252 gallons approximately.) Of the red wine, five-sixths was imported by native English merchants. Red wine was worth £4 a tun in England after duties were paid; sweet wine twice as much. The native merchants' importations represented an investment of £34,000 a year; the red wine and the sweet wine brought in by foreign merchants had a value of £12,900 a year.

Other merchandise exported and imported by native merchants was worth £57,100 a year; by Hanseatic merchants, £3,000; and by alien merchants, £32,700. The duties paid on these goods were respectively £2,900, nothing, and £2,000 a year.

The first thing to be noted about these figures is the extremely small volume of trade for a nation of over two and a half million people. Exports were valued at £182,400, imports, at £146,700. Outward and inward commerce thus represented a turnover of £329,100 annually plus £21,800 paid in customs duties, or a grand total of £350,900. This works out at less than three shillings per annum per head of population.

Not only were the totals small, but the ventures of the individual merchants were very limited. Thus of the shippers of wool from London in 1440 twenty-seven out of sixty-five merchants in the trade shipped fewer than three sacks each. Only twenty-six shipped more than forty sacks each.

A second fact that is of interest is the energy and enterprise of the Merchant Adventurers. The Staplers exported wool, and after receiving payment abroad "brought their money home," in

preference to buying goods abroad and bringing them to England. Actually they did not bring their money home but made it over by bills of exchange, which means that in effect they lent it to other English merchants abroad, chiefly Merchant Adventurers. These merchants purchased foreign goods, imported them into England, sold them, and then repaid the Staplers their money. The Merchant Adventurers did not merely export more than the Staplers; they imported the equivalent of the Staplers' exports as well as goods to counterbalance their own exports.

The Progress of Commerce, 1446-1482

This era may be divided politically into the final years of the war with France which ended in 1453, the period of the War of the Roses from 1455 to 1462 and again from 1469 to 1471, and the reign of Edward IV. Trade declined or was subject to fluctuation and depression during the first two periods; it recovered during the third. The wool trade, for example, fluctuating rather slightly from year to year, shrank to an average export of 5000 bales in the years 1460, 1461, 1462, which were the worst years of the War of the Roses. With the return of settled political conditions, the exports of wool once more went up only to fall again somewhat when civil war was renewed between 1469 and 1471. There was a fine recovery in 1472, and during the last three years of Edward's reign, from 1481 to 1483 inclusive, the average export of wool was 9784 sacks. Interestingly enough, the Staplers rather than the Italians were handling the increased exports.

The cloth trade responded more sharply than the wool trade to disturbed conditions. During the last years of the Hundred Years' War exports of cloth fell from 54,000 broadcloths in 1446 to 35,000 in 1450. This contraction continued with little relief until 1476. Between 1477 and 1483 exports of cloth began to increase again. The long-term decline in the cloth trade may be explained by the fact that English cloth was sold from the Baltic to Guienne, in Poland, Prussia, the Low Countries, and northern and southwestern France. In all these lands there were disturbances, and there were at times unfriendly relations between their rulers and the English government. These must be considered along with conditions in England itself in accounting for the

long-continued depression in this trade. Thus in 1447 Hanseatic privileges in England were suspended. In 1468 the arrest of Hanseatic goods again led to a suspension of trade which continued until peace was made in 1474. In 1447, to give another example, the Burgundian lands were closed to English cloth, and for twenty years, until the renewal of good relations between England and Burgundy in 1467, cloth exports to the Netherlands were restricted. In France the last phase of the Hundred Years' War, from 1449 to its close in 1453, had serious results for the cloth trade, and recovery in this market did not begin until 1471.

Similar reactions could be shown upon the trade in miscellaneous commodities exported and imported. Here recovery was rapid after 1471, surpassing the cloth trade in its expansion during the last years of Edward's reign. The wine trade, on the other hand, crippled by England's loss of Guienne in 1453, did not equal its former volume during the period under discussion. Native English merchants, importing 8500 tuns of wine in 1446, brought in only 3000 tuns on the average in the years from 1456 to 1462 and 2100 tuns during the years 1469 to 1471, which saw the renewal of the War of the Roses. Recovery began after Edward IV's final victory in 1471, and by 1478-1481 the average imports of native merchants were 6639 tuns. Yet the new figures were below those of forty years earlier and represent a real loss in trade. Only the rapid expansion of business in miscellaneous goods prevented a real decline in the volume of trade handled by native merchants.

By 1482, when the restoration of settled conditions had for some years been effective, English commerce shows certain definite gains. The value of exports was £216,500; of imports £201,000. There was thus a total foreign trade of £417,500, as compared with £329,100 in 1446. The Crown collected £34,300 in customs duties, as compared with £21,800 in 1446. Of the total trade the Staplers handled goods worth £58,000, chiefly in the form of wool exports, on which they paid £16,000 duty. As before, their imports were negligible. The Merchant Adventurers exported £75,500 worth of cloth and £6,000 worth of miscellaneous commodities, and on these exports they paid £2,400 in duties. They imported £23,100 worth of wine and £116,300 worth of miscellaneous commodities, on which they paid £3,400 in duties. The cloth exports of the Hansards were worth £28,000, and their im-

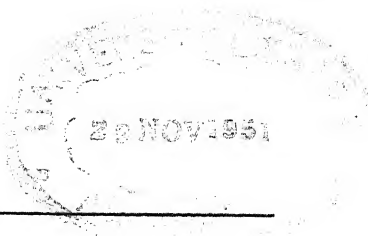
ports of wax, £5,500; their total trade was valued at £60,100 on which they paid £1,000 in export and import duties. Other foreign merchants exported £10,500 worth of wool and £29,900 worth of cloth and imported £5,000 worth of wine; miscellaneous commodities brought their trade up to the value of £78,500 on which they paid £7,900 in duties. The foreign merchants other than Hansards were actually doing £10,000 less business in 1482 than in 1446. The Hansards were doing £14,000 more. The Staplers increased their exports from £44,800 to £58,000. The Merchant Adventurers increased their exports by over £17,000 and their imports by over £53,000. They were exporting two and one-half times as much as the Hanse merchants and importing five times as much in value.

The so-called balance of trade, that is, the difference between what England sold abroad and what she purchased, was smaller in 1482 than in 1446. In both years the balance was "favorable" in the sense that England sold more than she purchased. Some people think that the larger the favorable balance, the greater the national prosperity. By this reckoning England was worse off in 1482 than in 1446. Actually, however, the reverse was true. England's larger favorable balance in 1446 was due to the fact that much wealth had to be sent abroad each year first to maintain the Calais garrison and secondly to supply English soldiers in France. That is to say, goods were sent abroad for military purposes for which an equivalent in foreign goods was not received. In 1482 there was only the Calais garrison to be supported, and more of the English goods sent abroad could actually be sold in exchange for foreign wares.

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THE TUDOR PERIOD

THE FAMILY or dynasty of the Tudors ruled as kings in England from 1485 to 1603. Their accession to the throne was followed by the end of the long period of civil wars which had been one of the manifestations of the political disintegration characteristic of the fifteenth century.

Yet political disintegration should not be overstressed. It was less a sign of fundamental decay than an indication that attempts were being made in a transition period to find a new set of conventions under which men could live together. Feudalism had been undermined by the rise of the money economy and of capitalism. Under the circumstance of increasing national wealth and in the face of a new spirit of acquisitiveness which the appearance of material wealth evoked, a new code regulating men's relations with one another was formulated only after a long process of trial and error.

The England which Henry VII began to rule in 1485 was a nation of about three and three-quarters millions of people. There had thus been an increase of about a million and a quarter in the hundred years and more since 1377. It will be recalled that in that year the population stood at between two and two and one-half millions, an increase of nearly one million over the figures for 1086, three hundred years earlier.

If these figures are even approximately correct, it is evident that the English population was growing more rapidly during the fifteenth century than it had in the past. By 1600, at the close of the Tudor period, there were perhaps 4,600,000 people in the country, representing a growth during the sixteenth century at a rate only slightly less than that of the fifteenth.

The rate of births was but little subject to regulation, being for the most part at the natural maximum, best summed up by

the medieval shepherd who complained of his wife, "And every year, sure I may be, she'll bring forth a baby." Consequently the change in the rate of increase of the population during the fifteenth and sixteenth centuries, as compared with the Middle Ages, can be accounted for only by decreases in the death rate. The advances in medical knowledge which came from the study of the Greek classics and from experiments on and the observation of the human body in the Italian universities probably had some effect in this matter. Yet the significant factor during these two hundred years seems to have been the increase in supplies of food and subsistence materials available for the English and other European peoples.

England, like the rest of Europe, was, until the end of the fifteenth century, a relatively closed and isolated economic area, with little dependence upon the rest of the world for essential supplies. Every significant increase in wealth rested directly upon the yield of her own soil and the productivity of her forests, farms, and mines. The supplies of food, wood, and other products which remained after the necessary requirements of the country populations were met determined in large part how many people could live in towns and cities and what amount of manufacture of raw materials into finished goods could be carried on. London is not the ideal example of the interaction of city growth and country surplus, since some of the dwellers in London were court functionaries and their servants and many were busied in commerce. Yet the London figures do give some indication of the extent of the process. In 1377 London had 43,700 inhabitants. In 1500 the city may have had 50,000 persons. In 1563 there were 93,000 inhabitants; in 1595, 152,000; and in 1605, 224,000.

The Price Revolution of the Sixteenth Century

There was one factor so all-pervasive in shaping the conditions of life as it was lived in Tudor England that it seems desirable to examine it before discussing developments in agriculture, industry, and commerce. This was an upward movement in prices of considerable magnitude over a long period. Taking the prices of the year 1500 as a basis, represented by 100, those of 1550 stood at 138, of 1600 at 209, of 1650 at 268, and of 1700 at 342. These figures do not refer to any special commodities, but are the aver-

ages of many commodities for which there are figures in documents of the time. Wages rose, but not nearly so fast as prices, so that the purchasing power of the average workmen and laborers in 1600 was only 47 per cent of what it had been in 1500, and only 40 per cent in 1650. It is generally recognized that this rise in prices is closely related to the increase in European stocks of gold and silver. The supplies of precious metal began to be augmented around 1450 by the development of the silver mines of central Europe. Then came the seizure of the hoards of the African and Asiatic chiefs and rulers by the Portuguese as they developed their seacoast empire along the coasts of Africa and in India. The Spanish conquistadores sent home the treasures of the Aztecs and the Incas. Finally the opening of the great American mines in Mexico and in the Andes by the Spanish prospectors fairly flooded Europe with the precious metals. As the supply increased, the value declined.

This general curve of price increases had superimposed upon it in England a second and sharper upward movement between the years 1540 and 1560, which was the result of a severe debasement of the coinage by the governments of Henry VIII and Edward VI. That is, while prices were already rising English prices were dramatically subjected to a second sharp upward thrust by the government's policy of reducing the amount of silver and gold in the coinage and substituting base metal. Time and time again during the years from 1543 to 1552 the coinage of the realm was called into the mint, to be reissued with a larger base-metal content. Eventually an English silver piece contained nine parts of alloy to three parts of silver. In 1560 Elizabeth's government again restored the money of the realm to its old standard and brought this inflationary movement to a conclusion. In some ways the effects of the price rise growing out of the debasement of the coinage may have been more significant than those of the long pull movement resulting from the fall in the value of silver and gold, since changes in the price level in the period from 1542 to 1560 were so great and were concentrated within a few years.

Very generally stated, the price revolution of the sixteenth century brought about an upward movement in prices, which, unaccompanied by equivalent increases in wages, made possible for farmers and businessmen, whether interested in manufacture or in commerce, a rate of profits larger than had been usual in

the past. To take full advantage of such favorable circumstances, aggressive producers and traders expanded their operations to the limit. Through the unusual efforts which they put forth to win the extra rewards now possible of attainment, expansion took place on every side. Moreover, the rise in prices together with the lag in wages acted to mobilize capital in a larger degree than before in the hands of the very men who would use it productively. In both town and country the capitalists—farmers and landlords, the merchant dealers, and larger-scale manufacturers—were thus aided in the process of introducing capitalist methods of production.

Agricultural Progress During the Fifteenth and Sixteenth Centuries

Agriculture played the major role in the enrichment of England during the fifteenth and sixteenth centuries. In the story of its history it is necessary to include certain developments which preceded the coming of the Tudors.

For nearly a thousand years after the first Germanic settlements had been made in the island, the English village had proved to be a satisfactory type of unit of economic and social life. It was ideally suited to the needs of a population which practiced self-sufficient farming, producing from the soil nearly all that it required. The superimposition of the manor upon the village and the introduction of serfdom between the ninth and the twelfth centuries provided the adjustment necessary to maintain a larger governing and fighting class. The expansion of the village area, the change from the two- to the three-field system, the improvement in farm stock and the increase in the yield per acre of grain made it possible for the village, from the twelfth to the fourteenth century, to support an increasing population on a somewhat higher standard of comfort.

Even in the latter part of this period, however, there were signs that the village itself was undergoing great changes. As the non-agricultural population grew to the point where it represented more than 10 per cent of the people of the nation, commercial farming for the market replaced subsistence agriculture in many places. It was no longer a question of a peasant carrying a few sheep to a neighboring market in order to purchase a new plow-

share. Here was involved the production, the gathering together, and the transportation over great distances of stores of foodstuffs, wool, leather, and other articles in far greater volumes than had been handled before. The incidental surplus of the peasants could not be depended on. The very magnitude of the business of feeding 10 per cent of the people away from the farms made it essential that agricultural practices be changed, with a view to producing crops which could be sold in the market rather than used on the farm for the subsistence of the farmers themselves. The new methods by which farming had to be carried on required considerable capital; prospect of profit was the motive which led men to undertake the risks involved in the new departure.

It was of the very greatest importance to English agriculture that during the sixteenth century a new body of men appeared as landlords and farmers. As purchasers of estates or as larger-scale capitalist farmers they introduced first of all a new spirit of aggressive enterprise and eagerness for profit. Still more important, these men frequently brought with them large amounts of capital with which they revived the farming methods on their newly purchased estates. Land is not something from which products may endlessly be taken with reliance merely on the soil, sun, rain, and human toil. It must be constantly fertilized with capital, in the form of buildings, tools, manure, new stock, and technical skill. During the Tudor period much wealth, created and accumulated in industry and commerce, found its way into the country to play its part in enriching the nation's yearly harvests.

London merchants grown rich in trade and high officials of the royal government comfortably off as a result of the piling up of salaries, annuities, pensions, and the profits of fees and perquisites sought the dignity of country homes, the social position which landownership gave, and the opportunities for good investment which farm profits presented. In addition to the capital brought into the country by new owners, much money was borrowed on mortgage by the older occupiers, who, as in later periods, often lost their land when their over-sanguine loans could not be repaid. A familiar character of the time is the debt-ridden landowner who had mortgaged his estate to the limit and then, unable to pay, had to surrender his land to his creditors.

Enclosures

The first evidence of the new capitalist agriculture is to be found in the practice known as enclosure. On certain manors there had long been a tendency for the villagers to exchange their strips in the open fields with each other in order to form compact farms. At times a more successful villager might buy up the strips of his neighbors and consolidate them into a single holding. These compact farms, however formed, could be plowed and cultivated to greater advantage and in general managed more profitably than the acre strips lying scattered about in the common fields. The process of laying strip to strip seems to have been in special evidence in the vicinity of large towns and industrial centers, where a steady market for wheat, butter, milk, meat, and hides made profitable their production beyond the amount required for village use.

In the second place the lords of the manor began to exchange their acre strips in the common fields so as to build up compact demesne farms in place of the demesne made up of scattered parcels. Such farms were leased to tenant farmers. The earliest tenants of this kind took over comparatively small plots, frequently secured their stock and seed corn from the lord, and more often than not paid their rent in produce or kind. But as the fifteenth century advanced and the tenants became more capitalistic, the farms became larger, the tenants supplied their own stock and seeds, and paid their rent in money.

Sheep Farming

The only concern of the farmer who leased a demesne was to secure the largest net product; he therefore used the land, regardless of traditional practices, for that crop which paid best. A good deal of attention was paid to sheep-grazing and wool-growing. Land hitherto used for arable farming was laid down to grass and stocked with sheep. Occasionally, in districts where sheep paid particularly well, the lords set about to appropriate to their own exclusive use the village common or waste, so that they might rent that too to a sheep farmer. If, in addition, they could get possession of the holdings of the villagers, the entire

area of the village might be made into a sheep farm. The villagers would move away, their houses would be pulled down, and what once had been a populous farming community would be a sheep ranch employing a few shepherds. Contemporary publicists deprecated such a development. They viewed with alarm the future of a land where "sheep eat up and swallow down the very men themselves."

There were, indeed, serious social consequences attending the depopulation of a village and its enclosure as a sheep farm. Society in the sixteenth century was not sufficiently elastic to absorb any large number of dispossessed country folk. If they went to the towns, very often they were not welcomed because they threatened to flood the labor market there. Many seem to have become vagabonds and tramps; and, given to stealing and disorder, they were regarded among the elements threatening the quiet and peace of the countryside.

Yet the social reactions of enclosure must not be overdrawn. The amount of land actually turned over to sheep in a century and a half was, as far as our real knowledge goes, less than 3 per cent of the area of the country. The surviving records show the enclosure of 516,673 acres of land in 24 counties between 1455 and 1607. The enclosed area represents 2.76 per cent of the total area of the counties in question. During that same time perhaps 50,000 persons were dispossessed from their land and compelled to seek work outside their native villages. Some of these certainly found work in other villages and some fitted themselves into town industry. Those who became "puissant rogues," forming only a fraction of the total, could not have been very numerous at any one time.

The seeming importance which sixteenth-century writers attached to the processes of enclosure and depopulation bears closer analysis. In the first place, it is to be noted that the outbursts against enclosures, depopulation, and sheep come at certain definite times, particularly in the years 1516-1517 and 1548-1549. Now these were years of economic depression. It is possible, first, that the reactions of what depopulation there was were felt the more keenly in the face of general hard times. Secondly, writers of the time, like publicists of many another period before and since, casting about for the cause of their current discontents, hit upon the most obvious and tangible phenomenon and made it

bear a degree of blame far beyond what a modern scholar would assign to it.

In the larger view of historical development the enclosure movement, as practiced by the villagers themselves for improved arable farming and by the landlords and farmers for introducing sheep, was one factor in agricultural progress. Its aim was to enhance the profit derived from the soil, and the two important writers on agriculture of the period, Fitzherbert and Tusser, advocated the new farming in "severalty" as contrasted with the older "champion" or open-field farming as giving more opportunity for individual enterprise and better returns. While some individuals were injured when the great manorial estate managed by a bailiff was replaced by the smaller separate farms run by individual farmers and their families, the nation as a whole benefited. There was greater surplus of agricultural products available than ever before to feed the town artisans who turned wool, leather, and wood, the clay and stone of the quarries, and the iron and copper of the mines into cloth and bells, pots and furniture, churches, houses, and guild halls.

Enclosures made for commercial farming and helped solve the problem of increasing the agricultural supplies available for the industrial and commercial groups of the people. There seem to have been other forces at work, too, tending toward the increase in the output of agriculture. Much attention was paid to farm stock, and both meat and leather were produced in greater quantities. There seems also to have been an increase in the yield of grain per acre. The best figure for grain yield, before the Tudor period, is 14.6 bushels per acre, about 1460, on the manor of Grantchester in Cambridgeshire. Just after the end of the Tudor period we have another bit of information about the yield of grain. The figures come from an exceptional farm, and they represent the most advanced agricultural technique of their day. In the years from 1612 to 1620 Robert Loder was growing from 19.8 to 35.4 bushels of wheat per acre. In one year his crop was as much as 14.6 times the seed.

Between the two dates, 1466 and 1612, lies the Tudor period. During this time Englishmen had learned how to increase the yield of their land from a maximum yield of 14.6 bushels per acre to a maximum yield of 35.4 bushels per acre. The increase in the normal yield was certainly not so great; it would be con-

servative to say that on the generality of the farms the wheat yield increased from eight or eight and a half bushels in 1450 to eleven bushels or so in 1600. Other grains, such as rye, oats, and barley, increased their yields in somewhat the same proportions.

Higher Rents

The increased yield of the English land began to express itself, early in the Tudor period, in increased land values. There is a famous passage in one of Bishop Latimer's sermons in which he speaks of the farm on which he had been brought up, for which his father paid three or four pounds a year in rent. Fifty years later "he that hath it now," that is, the man who farmed this same land in the reign of Edward VI, was paying £16 or more for it. Latimer adds a sad contrast between the happy state of his own father with his ability to serve the king, educate his son, and provide a dowry for his daughters, and the wretched state of the present farmer striving to pay the increased rent and make both ends meet. It may well be that the farmer in question was having hard sledding, and his hard lot was sufficiently common to arouse a good deal of popular feeling against landlords who stretched and "racked" rents to higher levels. Indeed, the prayer book of Edward VI contained a prayer that landlords might not indulge in the practice. Rents during the later years of the fourteenth century may have been something around 4d. (eight cents) an acre. On one manor, Hooton Pagnell in Yorkshire, they reached 9d. (eighteen cents) per acre in 1548 and 2s. 4d. (fifty-eight cents) per acre in 1621. On this same manor rents were 22s. 7d. (about \$5.50) per acre in 1930.

Yet higher rents are not permanently paid unless the land has a higher value, and the continuance of higher rents during the Tudor period is an indication of the enhanced value of the land of England during that time.

A Market for the Sale of Land

Contemporary writers, those not concerned with damning the "rent-rackers," made frequent reference to the change in rental values by the use of the phrases *old rent* and *new rent*. Old

rent was the rent which the land yielded during the fifteenth century or perhaps during the reign of Henry VII. The new rent was the rent based on the new values and frequently was several times the old rent. Augmented yield is certainly one, and a most important, factor in the increase of the value of land during the Tudor period. Yet there were other elements also, which must be considered. Land was becoming a marketable commodity, something it had not been in feudal times. Some men were willing to part with their interests in land, and others were desirous of acquiring a stake in the soil. The buyers seem to have been more eager than the sellers, and the competition for the chance to purchase land, under various forms of arrangements, contributed somewhat to increased valuation and higher rents.

The really great opportunity of the sixteenth century was a chance to purchase land on the basis of its old rent. A sharp bargainer might often be able to buy a farm or an estate at twenty times the value of its old rent. To make his family's fortune he had then only to insist that his tenants should pay him a rent based on the yield of the land or perhaps even its potential yield. If the tenants had not already improved their farming methods they would be compelled at once to do so. The new landlord would grow rich on the new rent, but in many instances he could justify his wealth on the ground that he was an effective agent in forcing its production.

The Monasteries

Socially considered, one of the greatest changes in the economic history of England during the Tudor period grew out of the subjection to the new rent of the vast estates owned by the monasteries. The conservatism of the monastic corporations has already been touched upon, in connection with their insistence upon the continued enforcement of their ancient rights. They seem to have been just as conservative in their unawareness of the existence of technological progress; and their estates began to look like islands of old-time methods in surrounding areas of progressive agriculture. As early as the reign of Henry VII there seem to have been people who, from their acquaintance with the monastic economy as stewards of conventual estates, saw the possibilities of profit if these far-flung properties could be brought in

line with current developments. To do this they seem to have envisaged the suppression of the monasteries and the division of the land among their own kind. At the very beginning of the reign of Henry VIII, Edmund Dudley in a little book entitled *The Tree of Commonwealth* urged the young king to have nothing to do with ideas of this kind. Within thirty years of Dudley's warning the suppression of the monasteries and the annexation of their properties by the Crown were under way and well-nigh completed.

It was the purpose of Thomas Cromwell, Henry VIII's chief minister, who conceived and in large part carried through the suppression, to use the monastery lands as royal estates from which a permanent revenue might be derived in the form of annual rents. The Crown's need for great sums of ready money between 1540 and 1546 to meet the expenses of preparing for and fighting a great war with France, led to the sale of seven-eighths of the confiscated monastery estates by the time of the death of Henry VIII. During the reign of Edward VI the property of the chantries was confiscated. At the beginning of the reign of Elizabeth exchanges between the Crown and the bishoprics were arranged, which brought some of the most valuable estates of the bishoprics into the possession of the Crown. The need of ready cash compelled the various later Tudor sovereigns to repeat Henry VIII's practice of selling one-time church land in large amounts.

As a result there was in existence in England at various dates between 1540 and 1603 a land office for the sale of Crown lands acquired from the monasteries, chantries, and bishoprics. Usually the Crown sold its properties at "twenty years' purchase," that is, at twenty times the annual rental value. The rental value which was used in arranging the sales was the old rent. Those lucky enough to be permitted to purchase land on these terms invariably exacted higher rents from their tenants and with their new rents laid the foundations of aristocratic families, some of which have continued to be important to the present day. The exaction of the new rents literally compelled the introduction of improved farming upon hundreds of thousands of acres of land. The new owners profited. The tenants did not lose, unless they had already been progressive enough to adopt an improved technology while still paying old rent, and in that case they lost only

to the degree in which they had to divide their gains with the new owners. The nation as a whole benefited considerably, at least in a material sense, by reason of increased production. Much of the glory of the reign of Elizabeth was based on the increase in material wealth suddenly brought into being on land once the property of church corporations. Over a considerable part of the country relatively backward agricultural practices were replaced almost overnight by more advanced methods. The increased output which ensued, all the more effective because it was made available in large amounts within a comparatively short time, greatly stimulated and perhaps even overstimulated English national life.

The increases in rents to which reference has just been made were in the first instance increases in the rents of the demesnes which were leased to tenant farmers. It will be remembered that in every village, in addition to the demesne, there was the land of the free tenants and the land of those whose ancestors had been serfs. The serfs were virtually all freemen by the Tudor period, and, since they held title to their land by virtue of a copy of the record in the court roll of the manor court, they are frequently known as copyholders.

In general the rents which the copyholders had begun to pay for their holdings when they transformed labor services into rents were regarded as fixed and unchangeable. It was difficult for a landlord to increase these rents, and under the most favorable conditions a copyholder continued to cultivate his holding and pass it on to his successors at a rent which bore no real relation to current prices and values.

Yet in other cases, even if the copyhold rents could not be increased, the landlords found ways to take the benefit of augmenting values. In certain manors the copyhold ran for only a single life or even for a series of perhaps three lives. At the term it "fell in," and the lord might let it out to a new holder on an entirely new contract, such as a lease, at an economic rent. Or again, on many manors custom permitted the lord to exact a fine from the heir of a deceased copyholder at the time of his entry upon the holding. If, by custom, this fine was "certain" or fixed in amount, the lord could not raise the amount of the payment. Under these circumstances the copyholder was in a very favorable position. But if the fine were "uncertain," it might

be increased to the point where it equaled the capital value of the land. In the case of a copyhold for an indefinite number of lives with a fine certain, the copyholder was virtually the proprietor of his holding, and after paying a small customary rent he and his heirs profited by every improvement in technique and by every rise in prices. Where the title was for a limited period or subject on transfer to the payment of an uncertain fine, the lord of the manor stood eventually to reap the major part of any increases in value and income. On some manors, incidentally, where the demesne rents remained unchanged during the sixteenth century, the landlords used augmented fines on the occasion of the renewals of demesne farm leases as a means of increasing their own incomes.

Even where tenure was for an indefinite period with a fixed fine, the lord might try to force the copyholder out of his holding. Since the whole system of copyhold tenure was a matter of intramanorial arrangements, which depended upon the custom or law of the manor in question, there was for a long time no protection outside the manor court for the copyholder against the landlord. In the year 1439 the Court of Chancery began to give relief to injured copyholders on the ground of equity. Not long thereafter the royal judges of the common law courts, hating to see good legal business and fees being routed through another court, opened the common law courts to dispossessed copyholders. The remedy of damages for trespass which they offered was not really sufficient, and it was felt to be necessary for the Tudor government to devise a simpler and more satisfactory procedure. This the Tudors attempted to do through the prerogative courts, such as the Court of Requests. Yet for various reasons the odds in a case of dispossession lay with the landlord rather than with the copyhold tenant.¹

Agricultural Labor

Serfdom as practiced in the Middle Ages was virtually at an end when the Tudor period opened, although many individuals remained in an unfree condition all through the sixteenth century.

¹ Further attention will be paid to the story of the suppression of monasteries in the chapter on Public Finance. Some figures will be given also, so as to permit some knowledge of the dimensions of things.

No legislation ever provided for the end of serfdom, but a judicial decision of the reign of James I may be regarded as placing a legal termination to the institution. As the serf gained his freedom and forced labor ceased to be exacted from him, his place on the demesne farm was taken by the free laborer who worked for a money wage. Almost immediately the lord of the manor or the tenant farmer who leased the lord's demesne discovered that free laborers could not be subjected to the degree of control, under existing manorial arrangements, that had been exercised over unfree serfs. Since the manor court could not adequately coerce free laborers, for the simple reason that they might remove themselves from its jurisdiction by going elsewhere, the landlords began to think of royal control over labor as a solution of their problem. The first indication of the use of royal authority to replace the manor court as a means of dealing with labor problems came with the Ordinance and the Statute of Laborers of 1349 and 1351 which attempted to fix rates of wages by the authority of the central government and to enforce these rates through royal officials, the justices of laborers.

The Economic Policy of the Tudors

With the advent of the Tudors the need for extensive central control over labor was the more evident as serfdom disappeared and as the manorial court further lost its authority. In recognition of this need the Tudor monarchy gradually developed a quite complete degree of royal control over labor, largely in the interests of the landowners and farmers. Thus, in the reign of Henry VII, the justices of the peace were authorized to fix prices and wages and to make regulations regarding beggars, tramps, and alehouse keepers. The justices of the peace began to be authorized to undertake the control of agriculture, and incidentally of industry too, under the direction of the national government, in view of the failure of the communal and feudal agencies, such as the manor and the gild, to continue to function effectively.

In the course of the sixteenth century the royal government interested itself more and more in the regulation of the country's economic life. At first sight it looks as though the Crown had a well-formulated policy, and some scholars have actually rationalized a statement of that policy by deducing a set of general

principles from the specific governmental measures. Closer examination, however, suggests that action by the Crown was not continuous; and thus, if there was a consciously held set of principles of social policy, it was applied only sporadically. Curiously enough, the Crown measures seem to be grouped around periods of depression and hard times. It is possible that they were responses to pressure for relief imposed by various groups, and with the return of better conditions a relaxation of governmental regulation is to be found. Moreover, at different times in the century the pressure groups had different ideas about what they wanted. What was felt to be desirable in 1601 might be quite the opposite to something granted by the government, say, in 1563. This does not mean that the government was following two opposing policies, but that it was following no set policy beyond the necessary one of yielding to political pressure. On one occasion, at a time of shortage of labor, it might adopt an anti-loafing law to force men to work; at another, it might try to prevent the flooding of the local labor market by preventing jobless men from settling in any other place than the one in which they were born.

During the sixteenth century there were a number of periods of business and agricultural difficulties. Depressions centered in the years 1495, 1517, 1548, 1565, 1569, 1587, and then became chronic during the last years of Elizabeth's reign. In the eleventh year of Henry VII's reign (1495) the government, convinced that the enclosure of land for sheep farming and the eviction of the villagers from their holdings were responsible for the current discontent, forbade enclosures and evictions by securing Parliamentary statutes to that effect (11 Henry VII, chapters 16 to 19). At the same time, to give relief to the farmers employing labor, hours of labor and maximum wages were fixed, with legal provisions to prevent laborers from withholding their labor to secure higher pay. To prevent disorder on the part of the unemployed, vagabonds were to be expelled from the townships where they were found and beggars were to return to their own hundreds and stay there.

In 1517, when conditions were again bad, Wolsey was at the head of affairs. Convinced, with characteristic reliance on old, unproved, and generally accepted notions, that sheep farming and evictions had a lot to do with the situation, he ordered a great investigation to search out the landlords responsible for enclosures

and evictions in order that they might be compelled to undo their work. Needless to say, nothing was done beyond the investigation.

Again, in 1548, agrarian discontent swept over the country, taking the form in 1549 of armed risings from Cornwall to Norfolk against enclosures, higher rents, higher fines, and encroachments by the manorial lords upon the common waste. The depression of which 1548 was the center was already under way in the previous year. On the ground that "the force and puissance of this our realm which was wont to be greatly feared of all foreign powers is very much decayed, our people wonderfully abated, and these that remain grievously oppressed," the government in 1547 appointed a commission of inquiry. Neither the commission nor the rebellion had any effect either in curing the depression or even in stopping the supposed causes thereof. Rather, owing to a shift in politics, which brought a gang of land-grabbing gentry into control, statutory authorization was given to encroachments upon the common waste, one of the things which had been popularly held to be responsible for the depression.

Conditions improved after 1549, however, and during the 1550's there seems to have been a kind of boom under way. There was actually a shortage of workers, owing perhaps to a very rapid development of commerce and an expansion of industry both in the towns and outside them. A labor scarcity in agriculture was threatened; in some quarters it was believed that the farmers must be protected by special legislation from raids upon their labor supply. As the first indications were noted of the beginning of a new depression (which was to reach its climax in 1565) the government sponsored a measure, really only one in a series which had been enacted during the past decade, to insure a constant supply of labor in agriculture. Agriculture was given a previous claim on labor, and the maximum wages to be paid were to be fixed by the local justices of the peace (themselves generally landowners) in their meetings in Quarter Sessions. This law is the famous statute (5 Elizabeth, chapter 4) often called the Statute of Apprentices, because in addition to providing agriculture with a cheap labor supply, it introduced the seven-year apprenticeship as a matter of national policy authorized by statute.

At the same time, keeping well in the groove worn by its predecessors, the government by the statute 5 Elizabeth, chapter 2

ordained that lands in tillage in the years from 1529 to 1533 should be kept so. This was merely a reiteration of the policy, already shown to be futile, of preventing the "decay of houses" and checking enclosures for sheep farming. Since enclosures had little to do with the real causes of the depression it is scarcely necessary to say that neither this law nor its analogues earlier and later were of any importance except as showing how persistently contemporaries can be wrong both in analyzing their problems and in prescribing remedies. A third act of 1563 permitted the export of wheat and other grains when the price of wheat in England fell below 10s. per quarter, with the prices of other grains in proportion. The regulation of grain prices by controlling import and export was a form of farm relief which went back into the fifteenth century. In its earlier form, under the statute of 1463, it had taken the guise of the prohibition of grain imports. Henry VII and Henry VIII had followed a somewhat contrary policy in the interests of the consumers and had prohibited exportation except under royal licenses, which, incidentally, were frequently issued. Mary's government had permitted export when the price of wheat fell below 6s. 8d. per quarter, but since wheat seldom sold for so little, this concession was of small value to the farmer. The act of 1563 was followed by a number of other acts for "the increase of tillage" which seem to have attempted to combine aid to agriculture with protection to the consumer. In 1571 exportation was permitted without reference to prices, but the justices of the peace were authorized to intervene if prices rose too greatly in any locality. Moreover, a duty of 1s. per quarter on wheat exported was now exacted by the Crown. In 1593 the duty was raised to 2s. when the price exceeded 20s. per quarter, in an effort perhaps to discourage export in the interests of the consumer when prices rose to this level. On the whole so little grain was exported that the government's measures can have had but little effect on prices. Even the revenue aspects of the legislation, which certainly had some significance in securing its enactment, were of very minor consequence.²

² See references at end of Chapter 8.

Chapter 8

INDUSTRY DURING THE TUDOR PERIOD

Forestry and Mining

AGRICULTURE is only one of the extractive industries. Forestry and mining must also be considered in the story of the production of the raw materials of a nation's wealth. Very little work has been done on the history of English forestry, and virtually nothing is known about the progress of forestry during the sixteenth century. Yet it is certain, from the complaints raised during Elizabeth's reign about the growing scarcity of timber, that the forests were being actively exploited, and even exhausted, to obtain wood for building and for fuel. The history of mining and quarrying is somewhat better understood. It is known, for example, that during the fifteenth century, on the continent, there was a remarkable advance in mining technology. Water, which is always a problem in mines, was brought under some degree of control, and thus it was possible to dig mines to deeper levels. In England there seems to have been a good deal of activity in mining tin and copper, iron, and coal. The extraction of copper, lead, and zinc and the manufacture of brass from these metals were chief business activities of the Society of the Mines Royal and of the Mineral and Battery works, two of the greatest industrial corporations founded during the reign of Elizabeth. The mining of iron ore and the smelting and forging of iron are believed to have increased steadily in volume from the reign of Henry VIII to the beginning of the reign of James I. Statistics of the production of coal and the history of the industry of coal mining and distribution are much more complete. Coal had been burned in England for several centuries. Yet except in the case

of the Tyne valley, previous to 1500 probably not more than a few hundred tons of coal a year were carried more than several miles from the place where they were mined. In the valley of the Tyne, where the city of Newcastle was the center of the coal trade, the total volume of coal shipped to the continent and to other parts of England probably did not exceed 15,000 tons at the beginning of the sixteenth century. By 1550 the mines in England were producing 169,000 tons annually, with 40,000 tons more in Scotland and 1000 tons in Devon and Ireland. By 1608-1609, the Newcastle area, which was producing perhaps a third of the English coal, was shipping 239,000 tons.

Internal Transportation

Closely associated with the rise in the production of basic raw materials as a factor in sixteenth-century progress were great advances in land and water transportation, which extended the available market for what the farm and mine produced and made it possible to bring back to the country the goods for which grain and coal were exchanged. There are many indications that the amount of travel on the roads increased rapidly. Travelers came and went, royal officials were constantly on the go. The king, the royal family, and the court moved frequently from one royal palace to another, transporting furniture, clothing, and supplies in great heavy wagons. By the middle of the century the roads were so heavily traveled that demands began to be made for repairs and improvements. In 1555 Parliament passed a statute for the maintenance and repair of the highways. When John Leland made his six years' journey through England in the latter part of Henry VIII's reign (between 1535 and 1543) to learn at first hand the nature of the country, he seldom complained of the roads except where they ran over heavy clay soil which made bad going. He frequently noticed improvements, such as bridges over rivers and causeways over wet sections. Thus, on the road between London and Banbury there was a great causeway, "else the way in wet time as in a low stiff clay were tedious and ill to pass." Merchants who rode a good deal about the country on business frequently built causeways and bridges at their own expense as a public benefaction. Thus George Monox, a London draper, built

a timber causeway across the Lea marshes, and Hugh Clopton built a handsome bridge at Stratford-on-Avon.

Most travelers rode on horseback. A well-developed system of posting inns, where fresh horses could be hired, was in existence by the latter part of Elizabeth's reign. Twelve miles was a day's journey ordinarily, but under pressure journeys of as much as sixty miles a day could be made. A certain amount of freight went by horseback also. Farmers frequently went to the mill, sitting on the bags of grain across the horse's back. There seems to have been a good deal of wheeled traffic on the roads. In spite of obstructions in the rivers, heavy goods went by water, up and down the inland rivers, or they were shipped along the seacoast. The Tyne valley coal, for instance, was almost entirely transported by sea from Newcastle to London and other ports.

Technological Progress

An increasing population able both to produce and to consume more goods because of their larger numbers is one factor in sixteenth-century progress. Yet it must not be thought that the new civilization was crudely dependent upon mere numbers, either for more power in production or for greater demand in consumption. Technical and mechanical improvements and invention, which increased output quite apart from the number of producers, and higher standards of living and comfort, which created the desire for increased volumes of supplies among even the same number of individuals, are characteristics of the new civilization of the sixteenth century. The increases in standards of living, which range from better food all the way to the writing of Shakespeare's plays, are part of the social history of the day and can be read in detail in many books. The technological advances of the period are less well understood. The fifteenth century had made many contributions. Mechanics, whose predecessors already understood the primary principles of complicated mechanisms, had developed great skill in construction. Mills, for example, were more accurately fabricated, and gear wheel arrangements were worked out for applying power (generated in wind and water mills) to heavy duty requirements, such as stamping ore, hammering metals, drawing wire, and producing air blasts. Canal locks were built in France, and silk-winding machines, in Italy. Stone cannon

balls were replaced by those of iron. Bookkeeping was reduced to an exact science. Improvements were made in the reduction of iron ores in the high furnace and iron casting was introduced. Here the new processes were made possible by the use of water power to provide stronger air blasts for the smelting furnaces and to work the great hammers to forge the ingots. Above all, the fifteenth century had carried through to completion the inventions of the chain of processes which is known as the art of printing.

The sixteenth century built on the work of its own immediate past. New tools and machines were constantly being invented, such as the treadle-driven spinning wheel, the gig mill to shear or finish cloth, and the knitting frame, the work of William Lee, curate of Calverton, near Nottingham, which repeated exactly the motions of a woman knitting by hand. A single example of the effect of these inventions may be given. A skilled hand knitter was capable of making 100 stitches a minute; Lee's machine, operated by a child of thirteen, could make from 1000 to 1500 stitches a minute.

Large Capital Investments in Industry

As a consequence of the development of mills and machines which were costly to build and install, a number of industrial enterprises came into existence in which the capital outlay was on a new scale of magnitude. It has been estimated that the forge, the grinding wheel of the miller, or the loom of a craftsman represented the investment of but a few pounds. In the middle of the reign of Elizabeth, John Spilman, a naturalized German, set up a paper mill at Dartford. There were two great water wheels to drive the hammers for beating the rags. One of these had formerly been used in a blast furnace, and the cost of converting it to its new purpose is said to have been £1,400 or £1,500. In Surrey there were powder mills, built about the middle of the sixteenth century, where the machinery was probably as costly as in the papermill just referred to. They were driven by water power, and, in addition, had expensive arrangements for drying the powder. During Elizabeth's reign the process of hammering brass and copper ingots into plates was introduced from Germany. The great hammers of these "battery works," weighing as much as five hundred pounds apiece, were driven by water wheels. Sugar re-

fining, brassmaking by the cementation process, the manufacture of saltpeter, glassmaking, and the large-scale manufacture of salt were other newly introduced industries where machinery, used in small factories, required a considerable capital outlay.

Establishments of this kind owe their significance less to their numbers, which were small, than to the fact that these industries could not be carried on in any other way. If sugar refining, glassmaking, or brass manufacture were to be carried on at all, they had to be organized as capitalistic large-scale enterprises. Their real significance lies in the fact that they served as prototypes of later progress. More importance, perhaps, attaches immediately to the development of deeper mines, with their shafts, ventilating arrangements, and pumps, and to the introduction from the continent of the new type of blast furnaces, twenty feet square at the bottom and thirty feet high, provided with leather bellows twenty feet long, driven by an overshot water wheel to create the blast. These new furnaces might cost £1,000 to erect; they provided work for scores of workmen, and turned out from 100 to 500 tons of iron a year. The forges, in which the iron was refined, represented with their heavy hammers and water wheels almost as great a capital outlay as the furnaces.

Of great significance in the new technology in England was the increasing use of coal as a fuel. Owing to the growing scarcity of wood in England, experiments were made with a view to increasing the efficiency of heating devices so that either they would burn less wood or would permit the burning of coal. The use of coal as an industrial fuel was destined to cheapen the product, enlarge the scale of the enterprise, and concentrate industry near the mines. The effect of the use of coal in enlarging the size of industrial undertakings is well illustrated by the developments in the manufacture of salt. In the earlier part of the sixteenth century sea salt was generally made as a kind of casual product by peasants who owned little salt pans in which they evaporated sea water over wood fires. With the introduction of great iron pans, twenty feet square and five or six feet deep, heated over great coal furnaces, the business of making sea salt became capitalistic and tended to be concentrated, moreover, on the Tyne and Wear and near the Firth of Forth, near the coal supplies. As early as 1589 one capitalist salt manufacturer claimed that he employed 300 men in his

salt works on the Wear and that the works represented an investment of £4,000.

The growth of large-scale industrial establishments using expensive machinery driven by water wheels, which represented a capital investment very large in comparison with what was required by a craftsman, was to accelerate its progress during the seventeenth century. In addition to the cases already discussed, in certain branches of the textile trades, particularly in the dyeing industry and in the finishing of cloth, where costly equipment had long since been used, large-scale units were general. Occasionally in the other processes of textile manufacture a daring entrepreneur tried to introduce factory organization and methods. Thus, as early as the reign of Henry VIII, Jack Winchcombe of Newbury is said to have employed 1040 persons, including 200 weavers, 200 quill boys, 100 women carding wool, 200 girls spinning, 150 children picking, 50 shearmen, 80 rowers, 40 dyers, and 20 fullers. Even if the numbers of the different workers are somewhat open to suspicion, there seems to be no doubt that he had a factory where every operation of cloth manufacture was carried on under his own direction. So fine were the Winchcombe kerseys that in the Antwerp market other kerseys were graded as "below Winchcombe" and "almost as good as Winchcombe." Another entrepreneur, named Stump, leased the Abbey of Malmesbury, after its suppression as a religious house, "to be full of looms and to weave cloth." Later he is alleged to have leased an abbey near Oxford, agreeing to employ two thousand persons.

The Domestic or Putting-Out System: A Type of Capitalist Industry

Yet, interesting as these examples of the early appearance of the factory system are, capitalistic changes and innovations in industry during the sixteenth century were more generally along entirely different lines. In many cases capitalism in industry took the form of investment by an entrepreneur in larger amounts of raw materials, which he continued to control through all the stages of its manufacture. This was carried on by workers working in their own homes, with comparatively simple machinery and tools. The entrepreneur distributed the materials to the workers, collected them again, and paid the workers for what they had done.

The goods were then given to the workers who performed the next operation, and so on until the final product was ready for market. In the textile industries the entrepreneurs, known as the clothiers, distributed the wool to the spinners and the yarn to the weavers, and carried the rough cloth as it came from the loom to the fullers and dyers. This system is known as the putting-out system. In actual practice there were various modifications of the arrangement. In the Welsh counties of Cardigan, Caermarthen, and Pembroke cottage weaving, originally for personal consumption, was fostered by the drapers of Shrewsbury who purchased from the cottage workers the rough friezes of the district and had them finished. In the eastern counties the production of yarn was organized under the control of capitalist master combers. They sold the yarn either for export or in London, where it was purchased by weavers of small means who wove the worsted cloth on their own account. In the western counties many spinners refused to spin for the clothiers for low wages, but purchased their wool in very small parcels and sold their finished yarn, and, "having the benefit both of their labor and of their merchandise, live exceeding well."

The putting-out system had the advantage of permitting comparatively large-scale operations in an age when capital was not yet overabundant and when the capital available was not yet mobilized but was still scattered in many hands. The entrepreneur made use of the little capitals of the workers represented by their tools and of the larger capitals of the fullers and dyers represented by their tucking mills, gig mills, and dye works, while he himself invested his own capital in raw materials and in a central warehouse or depot. The economies gained by this form of organization over the older craftsman system grew out of the superior organizing skill of the entrepreneur and out of his superior knowledge of markets for both raw materials and finished products. Thus the loss of time involved in the purchase of wool by a spinner and the sale of yarn to a weaver, in the purchase of yarn by a weaver and in the sale of the cloth as it came from the loom to a draper was eliminated. Moreover, a successful clothier could buy his wool and sell his cloth to better advantage than could the ordinary craftsman.

There was another "economy" which was early discovered in connection with the domestic system. Gild regulations cramped

the style of the early entrepreneurs; and to escape from the tyranny of gild rules they moved from the towns and sought their workers in the peasants' cottages throughout the country villages. In places where the only traditions of wages were those connected with agricultural employments, the pay which the entrepreneurs gave was low in comparison with town earnings.

The rise of country industry under these conditions was well under way by the middle of the fifteenth century, as is known from the legislative prohibition in 1455 of certain evils, such as the payment of the workers in goods instead of in money. During the Tudor period the extension of the domestic system continued at a rapid pace. Curiously enough, at least to modern ways of thinking, the industrial expansion which this development indicated was not universally approved. Thus, in the most thoughtful economic pamphlet of the middle of the sixteenth century, *Discourse of the Commonweal*, one of the speakers, representing the country gentlemen, declares that many wise men "think it better that all our wool were sold over the sea unwrought, than any clothiers should be set awork within the Realm. . . . They take it that all these insurrections do stir by occasion of all these clothiers; for when our clothiers lack vent over sea there is a great multitude of these clothiers idle; and when they be idle, then they assemble in companies and murmur for lack of living, and so pick one quarrel or other to stir the poor commons, that be as idle as they, to a commotion." The general feeling was that if the industry had to expand, it ought to be confined to the towns.

This view was, of course, shared by the town workers, who found themselves in competition with the cheaper country workers. Many craftsmen who still maintained their own shops discovered that the merchant draper to whom they had previously sold their cloth was now in fact himself a manufacturer and thus in competition with them. Administrative interference with the activities of the wool dealers who, it was alleged, made prices high for the local craftsman was constantly evoked. More significantly, Parliament was called upon for assistance to special interests. Resultant legislation attempted permanently to stereotype the methods and forms of an industry just as it was entering upon a revolutionary transformation, and to confine that industry for the future within town limits where existing controls and regulations would have prevented virtually all development.

On the plea that the extreme covetousness of the clothiers who "do daily more and more study rather to make money than to make good cloths" was ruining the industry, Parliament in 1553 (by the act of 5 and 6 Edward VI, chapter 6), prescribed for all time the length, breadth, and weight of every kind of cloth made in England. In the same session the use of the gig mill, the earliest power-driven machine to be used in finishing cloth, was forbidden. The growth of the new class of employers who gave out work to country people was hindered by the requirement that they must have passed through a seven-year apprenticeship in weaving before they could become entrepreneur manufacturers of the new kind. This sort of legislation was continued during the reign of Mary in the Weaver's Acts of 1555 and 1557-1558. Taken at its face value, the act of 1555 was designed to end the new capitalism of the domestic system. No clothier, outside a town, should have more than one loom or receive any profit from letting looms or houses where they were set up. No weaver outside of a town should have more than two looms. No weaver should full or dye cloth. No clothier was to have any weaving done for him outside a town. No weaver outside a town should have more than two apprentices. No one should be a weaver who had not served a seven-year apprenticeship. The weavers wrote into the act everything they could think of to protect their position, and then they permitted or could not prevent the addition of amendments, which, even had the act been enforced, would have nullified it. Market towns remained open to industrialization, and the northern counties were entirely exempted from the provisions of the act. Amendments of 1557-1558 exempted the cottage industry of Durham and Cornwall, permitted existing establishments and practices in certain districts in which they were already set up, and even authorized their extension to new areas provided they were introduced by persons who had served an apprenticeship as a clothier. Still later amendments culminating in a law of 1575 gave the clothiers all they could ask in the way of freedom and elbow room. Virtually all areas where the domestic system had grown up were removed from the scope of the act.

In London the introduction of capitalist methods resulted in a set of arrangements of essentially the same kind as the domestic system, although the external appearance of the thing was dif-

ferent. The merchant dealers became manufacturers. They organized the processes of making goods very much in the same way that the draper and clothier did. But instead of distributing the raw materials among the workers living in the country, the London entrepreneurs entered into contracts with master craftsmen for the production of the articles they needed. These craftsmen themselves often employed considerable numbers of journeymen and often engaged in quite large enterprises. Some of the craftsmen groups of this sort, such as the shearers of cloth, developed guild companies which took their place in the ranks of the major guild organizations of their day. In reality the London system effected twofold economies. To the savings coming from large-scale operations managed by merchant dealers who knew the markets and the state of demand were added the increases in productive efficiency created by the supervision of the actual processes of production by skilled craftsmen.

While the examples of the operation of the putting-out system have been taken from the woolen cloth industry, it should be noted that this type of organization was used also in the hardware and other trades. It must also be kept in mind that during the Tudor period not all industrial enterprises were organized along the new capitalist lines. In every town many craftsmen continued to operate their shops as they had done in the past. In actual quantity of output these were the most important elements in industry. Moreover, there was a great deal of household production for domestic consumption.

It will be recognized from what has been said that the profit motive was a powerful factor in bringing about the changes in the industrial set-up just discussed. Profits can be increased if production remains stationary by the reduction of manufacturing costs. But the larger increases in profits are generally connected with an expanding market, which is the result of more customers and greater purchases on their part. One of the effective causative factors in greater purchases is price. The putting-out system played its part in inducing greater consumption because it decreased costs and lowered prices. Yet the real problem of the producers in the sixteenth century who desired to make greater profits was to effect far more dramatic price cuts than could be managed by any change in organization. The way in which this might be done is illustrated by the rise of the "new drapery."

The New Drapery

There is a certain amount of evidence to show that the production of the types of woolen cloth which had been looked upon in the past as standard goods fell off as the century progressed, or at any rate did not continue any rapid expansion. There may have been danger of stagnation in the old established cloth industry during the reign of Elizabeth. From this hazard the nation was saved by the introduction of the new drapery by workers who came to England from the Netherlands. Cloths of the "new drapery" were much lighter in weight than those of the "old drapery." Included under the designation of new drapery were cloths made of long-fibered worsted yarns, such as bays, says, gro-grains, mockadoes, narrow worsteds, plommets, carells, and fustians of Naples. The cloths of the old drapery, which were made from short-fibered yarns and felted or shrunk to produce a compact heavy body, weighed about a pound and a half per square yard. The cloths of the new drapery, generally speaking, ranged in weight around a half of a pound to the square yard, and some of the types were as light as a quarter of a pound to the square yard. The manufacture of these new varieties of cloth used smaller amounts of raw material than were required for the heavy broadcloths and longcloths. Still more significant was a shift in the relative numbers of skilled and unskilled laborers engaged in their production. More spinners were employed in proportion to the number of weavers, and there were fewer workers needed in the finishing processes of fulling, dyeing, and shearing. Thus the new draperies were significantly cheaper than the old woolen cloths. Since at the same time the new cloths caught the popular fancy because of the beauty of their patterns and designs and their lightness and convenience, their manufacture spread rapidly. To a certain extent they actually replaced the older types of cloth. There were, of course, certain individuals who could not make the transition from working in the old drapery to working in the new; and, indeed, there seem to have been whole districts which did not engage in the manufacture of the new types of cheaper, more popular materials. Cloths of the old drapery continued to be made, but seem to have scarcely held their own in face of the competitive strength of the new tissues. The nation profited

greatly by the development of the manufacture of types of cloth for which there were large markets which would not have taken the heavier, more costly cloths of the older types. Both domestic and export business was given a tremendous fillip by the development of commodities which people wanted and which were cheap enough for them to buy.

Industry and the Price Revolution

The reaction of the price revolution upon industry seems particularly important. It has already been indicated that the rise in prices upset or altered the social position of large groups, in so far as it rested on money. The working classes, working for wages which they could not force upward as fast as prices rose, were adversely affected. Indeed it might be suggested that the increase of vagabondage, which was very marked during the 1550's, was due to the feeling on the part of many that, since wages were so low that they could not earn a decent living, they might as well beg and steal their way. The anti-loafing laws of Elizabeth's reign were designed to compel such persons to work, when their labor was needed, for such wages as the justices of the peace considered proper. The employing, manufacturing, and commercial classes, on the other hand, profited. For with lower real wages and thus a lower ratio of production costs to selling price, these classes were able to take greater profits than before and to accumulate in their hands a much larger share of the wealth produced each year in England than had been the case previously. One scholar, J. M. Keynes, has calculated the ratio of prices to production costs during the sixteenth and earlier seventeenth centuries. The growth of this ratio, which he calls "profit inflation" gives the degree of the greater accumulation of capital in the hands of the manufacturers and traders which the price revolution made possible. Taking the period 1500 to 1550 as a base with a ratio of prices to costs set at 100, "profit inflation" rose to 112 in 1560-1570, 116 in 1570-1580, 120 in 1580-1590, 137 in 1590-1600, 139 in 1600-1610, 135 in 1610-1620, 141 in 1620-1630, 134 in 1630-1640, and 133 in 1640-1650.

These figures are estimates which will probably have to be corrected in the light of further research, but the process of rapid increase in business profits during the Tudor period which they

indicate is probably very close to the facts. It is, of course, true that, as has already been indicated, there were other factors which stimulated the development of capitalism during the Tudor period. But the possibilities of larger profits seem to have spurred expansion, and the consequent accumulation of capital in the hands of entrepreneurs provided them with the means of developing large-scale enterprises representing heavy investments.

As a result of the peculiar working out of the price revolution, the possession of the new wealth was, at the beginning of the capitalist era, concentrated in the hands of a comparatively small class. This class, often called the middle class, that is, the class between the masses and the aristocracy, came to control a large share of the material goods of the nation. They dominated the new civilization which was growing up in England, leaving to the poor little participation in its satisfactions and amenities. The working masses actually grew poorer, but the rich became richer to the limit of the dreams of avarice.

The middle classes did not remain in sole possession of their new wealth but were forced to share it with the governing classes. The Tudor sovereigns were particularly successful, as will be shown later in detail, in seizing from the nobility and the church land of which the rent could be raised to new economic levels. They phrased a new ideology which justified their tapping of the accumulations of the merchants and industrialists through loans, customs, direct taxes, excises, and other methods. By such devices a considerable part of the new wealth of the day was diverted to the support of an increasingly elaborate state system, to the public patronage of art in the form of castles and of royal portraits, to the support of a luxury-loving nobility, and to the provision of ways and means for English participation in a series of devastating international wars.

Patents of Monopoly

The activity of capitalist industrialists became particularly brisk during the reign of Queen Elizabeth. Frequently, on the ground of the risk involved in setting up new enterprises, the projectors received, by letters patent from the Crown, monopoly rights in connection with their product. In 1561 a company was formed to search for gold, to prospect for copper, and to work certain

mines in Northumberland. German capitalists agreed to bring over German artisans to carry on the work, while Cecil and other members of the council and certain London merchants advanced money to get the project going. In 1568 the company was incorporated as the Company of the Mines Royal, endowed with many rights designed to enable the company to provide a supply of copper and iron for the kingdom. At the same time the Mineral and Battery Company was chartered, to dig for "calamine stone" (or zinc), an essential ingredient in brass, and to manufacture brass wire and other articles made of brass. These two companies worked together very closely and in the seventeenth century were eventually united into a single corporation.

In 1565 the exclusive right to produce sulphur was given to Wade and Herlle, and four years earlier the first of a series of patents designed to bring about the production in England of adequate supplies of saltpeter was granted to a German named Gerard Honrick. In 1567 a patent was issued giving a company the exclusive right to make window glass, with the proviso that the patentees were to teach Englishmen their art so that at the end of the grant the process might be generally known. In 1563 Gaspar Seclar, another German, was given a license to manufacture salt in England, and two years later a patent for twenty years was granted to a syndicate headed by the Earl of Pembroke giving it the sole right to make white and bay salt by a new process. Other patents gave monopolies of the manufacture of starch, white soap, ovens, alum, dredging machines, and oils. The number of grants made was small in comparison with the projects which were presented to the queen for her consideration. Some of these were plain swindles like the project to set on foot the fishing trade without cost to any person through a loan of £103,000 from the queen to be repaid in three years. This project seems to have been a particular favorite of promoters for it appeared and reappeared in various guises for nearly a century.

The question of monopolies became important politically during the last years of Elizabeth's reign because of the rapid extension of monopoly grants in connection with the manufacture and sale of articles in reference to which no allegations of new introduction, speculative risk, or new processes could be made. Often such grants were made to courtiers in place of pecuniary rewards and, by bringing about higher prices, these caused much dissatis-

faction among consumers. In the Parliament of 1601 the popular feeling was brought out into the open in the course of a debate on monopolies. It was declared that currants, iron, powder, cards, ox-shin bones, train oil (cod liver oil), the transportation of leather, ashes, aniseeds, vinegar, sea coals, steel, aqua-vitae, brushes, saltpeter, lead, calamine stone, oil of blubber, dried pilchards, and other articles were in the hands of the monopolists. "Is not bread there?" shouted a member. "Bread," quoth one. "Bread," quoth another. "This voice seems strange," quoth another. "No," said the original speaker, "If order be not taken for these, bread will be there before the next Parliament." The queen met the debate by canceling certain of the objectionable grants and submitting others to examination at law. In 1603, in the case of Darcy vs. Allen, a royal court set aside the rights of the patentees for playing cards. Yet soon after James I's accession monopolies flourished again and were presently to arouse new storms of opposition.

Although the stock defense of monopolies has been that they resulted in the introduction of new industries and the development of new processes in England at a time when the timidity of capital would have prevented its venture on a competitive basis, the fact seems to be that it was rather the speculative greed of the day which wanted very high returns, than any question of real risk, which fostered the monopoly system. It might be interesting to note, moreover, that monopoly grants did little to create new industries. What was accomplished in this line was rather the contribution of immigrant artisans who fled to England from one country or another. During the reign of Edward VI a colony of Protestant Walloon weavers settled at Glastonbury and a German group at Austin Friars. Though compelled to leave England during the reign of Mary, they returned in ever greater numbers after Elizabeth's accession, driven from their homes by religious persecution and warfare. In 1561 a band of 406 persons from Flanders settled at Sandwich, Canterbury, and Norwich. Nine years later other refugees settled at Colchester. In these towns these foreign craftsmen began to manufacture those lighter and more fashionable cloths of the new drapery of which the importance has already been indicated. Other immigrant artisans introduced the manufacture of needles, brass-working, engraving, cutlery making, and glass manufacture. Silk weaving was begun by them at Canterbury, thread-making at

Maidstone, lace-making in Bedfordshire, in Buckinghamshire and around Honiton, and pottery-throwing in London and other districts. "The new impulse [to the rapid development of industrial arts in Elizabeth's reign] was chiefly due to that immigration of refugees which Cecil encouraged . . . he was keenly alive to the economic advantages which would accrue from their settling in England (Cunningham, W., *Growth of English Industry and Commerce*, II, p. 84).

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Chapter 9

FOREIGN COMMERCE DURING THE TUDOR PERIOD

THE FIFTEENTH century had witnessed the widening of men's knowledge of the world in a most remarkable way. Early in that century a line joining Lisbon, Galway, Lerwick, and Bergen represented the outer margin of Europe. The expeditions of the Danes to Iceland, Greenland and Finmark and of the Portuguese to the Madeiras, the Canaries, and the Cape Verde Islands widened the "utter margins" very greatly. The seamen of England, especially those from Bristol, early entered the newly explored waters of the Atlantic and were presently pushing westward to Newfoundland itself. Yet Englishmen of the time did not realize the significance of Columbus's discoveries of America or of Vasco da Gama's exploration of the route to India. Until the middle of the sixteenth century, at least, most Englishmen looked toward the southeast as their trade area. A few Bristol fishermen made their way to fish for cod in Newfoundland waters and a few observant reporters lamented the disappearance of Italian spice merchants from Southhampton because the king of Portugal had the trade from Calicut and removed the market to Antwerp. When Wolsey, in 1521, tried to get the London companies and the Merchant Adventurers to fit out an expedition to the northwest, with a promise of substantial privileges in any new trade they might open up, the merchants indicated that they thought the idea merely a wanton risking of men's lives.

One of the most striking factors about English commerce during the sixteenth century is the rise of London to a position of overwhelming importance. At the end of the century William Camden, the first modern English historian, noted that London was still growing while the rest of the cities of England were

"rather decaying," and another writer declared that "all our creeks seek to one river, all our Rivers run to one Port, all our Ports join to one Town, all our Towns make but one City, and all our Cities and Suburbs to one vast unwieldy and disorderly Babel of buildings which the world calls London." Southampton lost the Italian trade, but with the expansion of the wine and woad trade with France and the development of trade with Spain, she retained her prosperity. Yet she tended more and more to become an "outport" of London, and cargoes landed here were carried overland to London. On the east coast Newcastle was being transformed into a coal-shipping port; Yarmouth became a fishing port and Norwich retained some of its cloth trade. Boston and its dependent towns were definitely "decayed," since they found no new lines to recompense the loss of their former commerce. Toward the end of the century the antiquary Stow tried to explain the decline of the provincial ports by quoting another writer.

Touching navigation, which I must confess is apparently decayed in many port towns, and flourisheth only or chiefly at London, I impute that partly to the fall of the Staple, the which . . . did enrich the place where it was . . . partly to the impairing of havens, which in many places have impoverished those towns . . . ; and partly to the dissolution of religious houses by whose wealth and haunt many of these places were chiefly fed and nourished.

In certain cases old ports lost their importance because ships became too large to enter them. Efforts on the part of the government to dredge out the harbors, such as those made by Henry VIII and Elizabeth at Dover, had no permanent effect in stopping the decline. The fact seems to be that as London increased in population, she afforded even better markets and her merchants provided better storage facilities, better credit arrangements, and better prices than could be obtained elsewhere.

Tudor Ships

About ships and shipping there is more information at hand than for earlier periods. It is known, for instance, that there were considerable increases in both the size and the number of English ships during the sixteenth century. One table indicates

that in 1545 there were 35 merchant ships of over one hundred tons owned by Englishmen. In 1577 there were 135, in 1588, 183, and in 1629, 350. Moreover, the average tonnage of the ships in this class increased, and the size of the crew required to handle a ship of given burden was reduced as ships were built to finer lines and sailors became more skillful. Aids to navigation came into general use. The compass, astronomical tables, the astrolabe, and maps and sailing directions made it possible to take longer voyages with greater safety. The printing presses of Antwerp turned out ocean maps in great numbers; the capture of Spanish ships by the freebooters such as Drake and Raleigh made known the secret sailing directions which the Spaniards had worked out for the Atlantic and the Pacific.

The Volume of Foreign Commerce

For the Tudor period there are not at hand such complete studies of the volume of overseas commerce as those which are available for the fifteenth century. Yet certain figures of the amounts collected in customs duties are known, and from these figures certain conclusions may be hazarded.

During the first ten years of the reign of Henry VII the receipts from customs duties averaged £32,951 a year. This figure is very close to that for the last years of the reign of Edward IV. Toward the middle of the reign of Henry VII customs receipts began to move upward, and for the period 1496 to 1509 they averaged £40,132 annually. This increase, which works out at about 22 per cent as between the first and second periods of the reign, was in part due to administrative improvements. Of these one of the most important was the introduction in 1507 for the port of London of a book of official valuations upon which the duties were to be paid. Yet the major part of the augmented customs receipts was the outcome of actual increases in foreign trade. For Henry VII, who was a king who could not endure to see trade sick, constantly busied himself with stimulating commerce. He frequently made loans to merchants on condition that during the continuance of the loan they extend their business operations and import or export larger amounts of goods than they had previously done. He extended the privileges of the English merchants, particularly of the Merchant Adventurers. He arranged a series

of trade treaties with France, Spain, Denmark and other countries which, by providing for the reciprocal removal of duties and restrictions on commerce imposed in more recent years, were designed to allow commerce to move more freely.

During the first ten years of the reign of Henry VIII the customs collections rose to £42,643 a year on the average. But this improvement was not maintained; and there was a fall to £35,305 a year from 1521 to 1529, and another drop to £32,195 a year on the average from 1530 to 1538. The fall is to be explained in part by the growing export of cloth, which paid low duties, in place of raw wool which was more heavily taxed. Another factor in the situation was the disturbed relations between England and the Netherlands and Spain which developed out of Henry VIII's attempt to divorce Catherine of Aragon. In all probability the long series of European wars of the time, such as those between Francis I and Charles V, also contributed to checking commercial progress.

In 1536 and 1545 national books of rates, based on the London book of 1507, were introduced. Possibly the effect of this change is to be seen as in part responsible for the rise of the customs to £40,120 for the last period of Henry VIII's reign, from 1539 to 1547. During Edward VI's time there was a sharp decline in customs receipts, owing partly to the unsettled political conditions in England and in Europe and partly to the continued replacement of wool by cloth in the export trade. In the year 1550-1551 the receipts came to only £25,897. In this year exports of wool to Calais were unusually small. There seem also to have been laxity and dishonesty among the customs officials, so that dues were not truly paid.

In Mary's reign committees of the council studied the various phases of the problem of the decline in customs revenues. It was resolved to raise the values on which duties were paid by issuing a new book of rates. The new book was issued on May 28, 1558. It raised existing valuations by about 75 per cent. To make good the loss in customs due to the falling off of the export of wool, a much heavier duty was laid on cloth exported, and new duties, known as imposts, were levied upon French wine and French dry wares imported and upon beer exported. During the fourth year of Mary's reign (1557-1558) the customs receipts were £29,315, only a slight increase over the figures for 1550-1551;

but during the first year of Elizabeth (1559-1560) the revenues rose to £82,797. Of this sum £25,797 was derived from the customs as levied in the past; £20,000 represented the increases coming from the increased valuations in the new book of rates, £26,000 was derived from the new duty or impost on cloth, £4,000 from the wine impost, and £3,000 from the beer impost. The very large collections of this year reflect not so much a sudden increase in trade, but rather the effect of the new duties.

The introduction of the new book of rates and of the new imposts of 1558 makes it impossible to compare the customs figures for Elizabeth's reign with those of the previous period. Yet it seems that trade was increasing, even if only slowly, during Mary's reign, and that this increase was maintained during the first years of Elizabeth's regime.

The middle 1560's witnessed a great slump in European business. Foreign trade fell off very greatly. In 1563, as the result of the piracy of the English in the Channel and of the passage of a new navigation act by the English Parliament, English trade in the Netherlands was suspended and the merchants were driven from the country for more than a year. In 1569, as a result of friction between England and Spain over English attempts to take part in the Spanish slave trade in America, English commerce in the Netherlands and in Spain was prohibited, and English foreign trade, recovering slowly from the depression, received another setback which lasted at least to the end of 1572. In 1573 the figures begin to rise again, but it is not until 1584 that the customs receipts are as large as they were in 1560. From 1584 on rapid expansion of English commerce is indicated by greatly augmented customs receipts, which reached £120,593 in 1595. After that year the customs receipts fell again, and for the last six and a half years of the reign they fluctuated rather seriously, reaching a low of £81,124 in 1599 and a high of £108,631 in 1601.

On the whole, the volume of commerce in the sixteenth century does not show as great a degree of expansion as might be expected. During the reign of Henry VII there was a fairly rapid development which continued, at a slower pace, during the first ten years of Henry VIII's reign. After that, as indicated by customs receipts, an apparent decline set in. This persisted, according to the evidence of the customs, until 1538. In the last eight years of Henry's reign there was a recovery, to be followed

by a recession in the reign of Edward VI. Yet it must not be forgotten that the exports of cloth were increasing rapidly though they paid so little in duties that they do not show up in the customs receipts. At the same time wool exports, which paid heavy duties, declined. In view of these considerations it is probably true that as cloth exports mounted, possibly after 1540, overseas business did not go into a slump even though the customs figures, registering the falling off of wool exports, showed a positive retrogression. In the reign of Mary, possibly as general trade improved, the figures show a reversal of their trend under Edward VI.

Commerce in Elizabeth's reign was undoubtedly brisker than ever before in English history. Yet there was no steady upward tendency, but rather a series of wavelike movements, upward during the first few years of the reign, then downward for ten years to 1572, upward again from 1573 to 1595, culminating in a state of unsettled equilibrium from 1596 to 1603. It must be noted, moreover, that the customs figures indicate a total volume of foreign trade which was at no time great enough to determine prosperity or its opposite for England. Many individuals were deeply concerned whether trade was brisk or slack, and many made great fortunes in overseas enterprise. But the mass of the people of the nation could scarcely have been deeply affected by what was sold or bought in foreign markets.

One of the factors in the failure of commerce to develop as rapidly as other economic activities seems to lie in the "universal passion for speculation" which attended the expansion of agriculture and industry in the Tudor age. Much capital was diverted from productive commercial enterprises into treasure-seeking which promised fabulous rewards. Such ventures as those of Drake into the West Indies and around the world to loot Spanish treasure, of Frobisher to find the gold which he was sure lay for the taking in the islands north of Canada, of the Company of Mines Royal formed in 1564 to discover gold and silver in England itself, and of the privateering expeditions against Spanish commerce after 1588 probably absorbed more capital than they returned. Merchants ventured into these kinds of enterprise on a large scale, and in so far as they did so, they were less inclined and less able to enlarge their commercial undertakings. The presence of privateers and of pirates in English waters during many years of the sixteenth century rendered unarmed commerce

unsafe and hesitant. The English freebooters, such as Drake and Hawkins, did not advance English trade, however romantic their exploits. They checked it.

There are several other general developments to be noted in the history of Tudor commerce. The tendency, as time went on, was for English merchants more and more to take the place of foreign traders in handling English imports and exports. During the reign of Henry VII the Hanseatic merchants controlled the trade with the Baltic and northern Europe. The Venetian "Flanders Galley" dominated Mediterranean business. Many Italian mercantile houses had agents in London. During the reign of Henry VIII, in 1532, the Venetian galley ceased to come to England. Henry VII had begun to nibble at the special privileges of the Hanseatic merchants. Edward VI's government withdrew them, and though Mary renewed Hanseatic rights, Elizabeth again revoked them in retaliation for Hanseatic attempts to drive the English Merchant Adventurers from Germany.

The fact that foreign traders ceased to be important in London, that the Venetian galley no longer came to England, and that the privileges of the Hanse were being attacked and eventually were withdrawn, is but a corollary to the activity and energy of the English in carrying on business themselves in other lands. English ships went to the Mediterranean in sufficient numbers to lead the Venetians to impose retaliatory duties upon exports of Venetian wares carried in English ships. During the period 1513 to 1534 certain London ships seem to have been regularly engaged in the Mediterranean trade. In northern Europe English merchants sought rather steadily to enter the territory of the Hanseatic League and trade there despite the Hanseatic monopoly. Relying on the treaty of 1474 the English demanded reciprocal rights in the Hanse towns, and a treaty of 1560 made liberal concessions to the Hanseatic merchants in England conditional upon reciprocal concessions to the English merchants in the Hanseatic cities. Eventually, in 1567, thanks to the rivalry of the Hanse cities with one another, English merchants were given a residence in Hamburg and little more than ten years later the town of Elbing granted similar rights. The ejection of the English merchants from Hamburg, as a result of pressure from the league upon the city, was the cause of Elizabeth's withdrawal of all Hanseatic privileges in 1580.

Trade in New Areas

The story of the English activities in opening up trade in new areas in its Tudor phases begins with the voyage of John and Sebastian Cabot to America in 1497. They found the New Isle (Newfoundland), and were rewarded for their efforts by Henry VII with a gift of £10. England's political tie-up with Spain may have been the factor which discouraged Henry VII from further interest in exploration in America, and this may have been the factor again, early in the reign of Henry VIII, which kept from fruition a plan which Wolsey discussed with the London Merchant Adventurers for an expedition to America. A few adventurers went to Mexico in the later years of Henry VIII's reign, and a number of fishermen seem annually to have fished for cod off the American coast.

On the whole, during the first half of the sixteenth century, Englishmen respected the Spanish control of America and the Portuguese domination of the route to India around Africa. Yet it was possible to interest them in projects for reaching the wealth of the Indies by the northeast or the northwest passages. Ever since Columbus's day, it was the popular belief that these passages existed, and many attempts were made by explorers of all nations to find them. In 1553 Sebastian Cabot returned to Bristol after a long absence in Italy to promote a company to discover the northeast passage around Europe to India. He succeeded in raising £6,000, in two hundred and forty £25 shares, to send out an expedition to search for the passage. One of the ships was wrecked on the coast of Norway, but a second reached the White Sea, in northern Russia, and its commander, Richard Chancellor, made his way overland to Moscow. Here the Great Duke of Moscow granted him trading privileges, and on his return to England these privileges, augmented by others granted by Philip and Mary, became the basis for the organization of the Russia or Muscovy Company. Many of the members of this new company were already members of the London Mercers Company and were actively engaged in business as Merchant Adventurers in the Netherlands. Perhaps this is a partial explanation for their constituting the enterprise as a joint stock arrangement, in which the active trading was carried on by employees known as factors, while the

capital equipment was supplied from the funds advanced in the purchase of shares by the merchants.

The mercers and Merchant Adventurers who conducted the Russian trade did not give up their goal of reaching India. Unable to negotiate the northeast passage, which has become commercially practicable only within the past few years, the merchants hoped to make contacts with India by overland routes from Moscow. In this connection the work of Anthony Jenkinson, one of the company's factors, is of great interest. He endeavored to reach Persia and India overland from Moscow, and while he never reached India, he did open up trade with Persia which was regarded as having great possibilities. It was thought, for example, that the secrets of forging and tempering steel and felting cloth might be learned there, that the old armor lying in the Tower might find a market, and that sons of gentlemen who had no occupation at home might secure employment in wars which might be stirred up between Persia and Turkey. Yet when war broke out between Persia and Turkey in 1581, the trade came to an end.

For twenty years after 1553 trade with the eastern Mediterranean "was utterly discontinued and in a manner quite forgotten as if it had never been." During the later 1570's certain London merchants became interested in that region partly for its own sake and partly because it offered the possibility of a new opening to the East through Turkey. In 1575 two of the greatest merchants of London, Edward Osborne, member of the Clothworkers Company, and Richard Staper, possibly a member of the Merchant Tailors, sent agents to Turkey by way of Poland to arrange to have William Harborne received by the Turkish authorities. Harborne, who also went by way of Poland, reached Turkey in 1578 and negotiated liberal trading privileges for his masters. On the basis of these concessions in 1581 Osborne and Staper received a charter from Queen Elizabeth constituting the Turkey or Levant Company, with a monopoly of trade between England and Turkey.

The majority of Eastern goods still continued to come to Europe through Lisbon, where they were purchased by the Dutch for distribution throughout England and other northern countries. In 1585 Philip II closed the port of Lisbon to Dutch merchants, and the growing scarcity of Indian products in northern Europe gave a new impulse to efforts to find more direct lines of trade

with the East. In 1591 Ralph Fitch, sent out by Osborne and Staper eight years earlier, reported on the fabulous wealth of India which he had reached by traveling through Asia Minor, down the Tigris, and across the Persian Gulf. The Levant Company immediately secured the attachment of a special clause to its charter giving it a monopoly of trade with India over the route followed by Fitch. Spanish power in the Mediterranean rendered the route impracticable.

Even before Fitch's report arrived certain London merchants obtained from Elizabeth permission to send a ship directly from England to India around the Cape of Good Hope, along the route claimed by the Portuguese. Since the king of Spain was now also king of Portugal, and England was at war with Spain, the procedure was justified as a war measure. Actually it was undertaken because the English had a pilot who had been in Portuguese service and knew the secrets of the navigation and sailing directions for reaching India. Commanded by Captains Raymond and Lancaster and piloted by John Davis, a little English fleet actually reached India. After a series of adventures, during which a number of rich Portuguese ships were plundered and vast treasure was captured, a small number of survivors reached home, sans treasure, sans ships, sans everything except their achievement in having reached India. In 1595 the Dutch began to make almost regular voyages to India. To win some of the trade which was so enriching the Dutch, London merchants subscribed £30,133 to organize an expedition to India. To these merchants, on the last day of the sixteenth century, the queen issued a charter recognizing them as the English East India Company. This company had a monopoly of English trade between the Cape of Good Hope and Cape Horn. At first regular voyages to India do not seem to have been intended, and the area in which trade was sought was rather the Spice Islands than the mainland of the Indian peninsula. But great rivalry developed between the Dutch and English companies, especially after they had eliminated Portugal as the dominant power, and in the course of the seventeenth century the English were almost excluded from the Spice Islands and forced to confine their trade to the Indian mainland. The company for a long time exercised no political rights and governed no territory in India. It was a joint stock enterprise, in which stock was held by London merchants, owning private property in cer-

tain Indian ports by permission of the native rulers without any thought of founding any political control. The actual voyages of the East India Company were scarcely begun before the end of the Tudor period. The development of the company as a factor in economic history is part of the story of the Stuart monarchy.

The Merchant Adventurers during the Tudor Period

The new trades, such as those to Russia, Turkey, and India, were developed by groups of enterprising and adventurous merchants, and it has long been held that they were justified in seeking monopoly rights in the enjoyment of the trades which they developed. Reasonable as this argument may sound, it is just possible that the sixteenth century regarded monopoly rights as a natural and usual concomitant of trade rather than as a special consideration in connection with the risk and novelty of new trades. The aim of all merchants seems to have been to secure for themselves and their associates the monopoly enjoyment of the trades in which they happened to be engaged. The Merchants of the Staple anciently enjoyed a monopoly of the export of wool to Calais. A clearer illustration of the interest of merchants in monopolies is provided by the later history of the Merchant Adventurers. The latter had received certain privileges in the Netherlands from which they excluded all who would not pay their entrance fees. Actually, in law, any Englishman could trade in the Netherlands during the fifteenth century. But if he desired to make use of the facilities and special privileges acquired by the gild of St. Thomas of Canterbury, the Merchant Adventurers' association, he had to pay the fees which the gild assessed. In 1497, as a result of the protests of the merchants of the northern cities that these fees were too high, Parliament passed an act which compelled the Merchant Adventurers' organization to reduce from £20 to 10 marks (£6 13s. 4d.) the fee for use of the gild's privileges. This act was on the face of it a victory for those who objected to the high fees which the gild had been charging. It was actually an admission, by implication, that the gild had the right to control trade and to impose entrance fees upon all English merchants, either from London or from the provincial ports, trading in the Low Countries. A new royal charter of 1505 reg-

ularized and strengthened the constitution of the Merchant Adventurers' Company.

The payment of the fee of 10 marks did not give full membership in the company but only the right to trade under the company's charters. There were thus created two classes of merchants, those with full membership, known as the Old Hanse, and the newer breed, known as the New Hanse. During the next fifty years the Old Hanse steadily sought to limit the admission of new men to such privileges as enrollment in the New Hanse permitted.

In 1564 the Merchant Adventurers received a new charter from Queen Elizabeth, which gave them for the first time a legal basis for a monopoly of the English cloth trade in the Netherlands. This charter granted the Merchant Adventurers the exclusive right to export unfinished cloth, with a top limit of 30,000 bolts annually. Finished cloth might be exported by anyone. Yet, since foreign demand, especially in northern and western Europe, was centered in unfinished English cloth, which was then dyed and sheared on the continent, the Merchant Adventurers now possessed that exclusive control of an important market which was the goal of every sixteenth-century businessman. And having won their monopoly, the Merchant Adventurers proceeded to use it in characteristic sixteenth-century fashion.

It was an assumption widely held in Tudor England that the foreign market was strictly limited, on both the side of supply and that of demand. If there were too many sellers of English cloth, their competition for customers would lower the price. If there were too many buyers of foreign wares, their competition would raise prices. It was much more desirable that trade should proceed on a stable basis from year to year, with the number of buyers and sellers, the volume of goods offered and taken, and the prices of cloth and foreign wares subject to no very great alterations. The Merchant Adventurers held these views, and by their policies in managing their monopoly they gave effect to them, with the result that instead of being an organ for the expansion of trade, the Merchant Adventurers actually kept trade in a straitjacket. The same generalization applies to most other companies. Even where, as in the case of the Muscovy Company, the first activities of the group led to the opening of a new trade, most later efforts were concerned with maintaining the control of the trade on a stable basis in the hands of those who had devel-

oped it. In some cases a company did not even develop a trade; its organization represented merely the efforts of a group of merchants already established to protect themselves from the competition of younger, more aggressive businessmen. Professor Unwin, writing on the charters of the various companies engaged in foreign trade, says, "We find in them little or nothing about expansion, and a great deal about restriction and vested interests. Indeed, it may be said without exaggeration, I think, that the one common feature which characterizes the whole of the charters is the express desire to exclude retailers and craftsmen from engaging in foreign trade."

Monopolies and the Trading Companies

Interesting as they are, then, the great commercial companies of the time must be considered in a dual role in sixteenth-century progress. They opened new trades but they prevented the fullest exploitation of trades which they opened. The study of the history of certain other merchant companies during the reign of Elizabeth will illustrate the point more fully.

In 1569, as the result of an unwarranted seizure by Elizabeth of certain Spanish bullion carried in ships which had to put into English ports in the face of bad weather and pirates, all English merchants were expelled from Spain. This country had been one of the best markets for English cloth, grain, and Irish hides, and there had been no restriction upon the merchants permitted to carry on business there. In 1574 a treaty between Elizabeth and Philip provided for the reopening of trade which had been closed since 1569. Some of the members of the Merchant Adventurers now proposed that the "disorderly" condition which had formerly prevailed should be remedied by forming the merchants engaged in the Spanish trade into a company. Merchants not in the trade before 1568 could be admitted only on payment of a large fine. The immediate result was a rise in prices for Spanish commodities, such as wine, olive oil, and oranges. In a similar way, in 1578 the merchants trading to the Baltic were organized into the Eastland Company, to provide machinery for the collection of damages done to a Dane by English pirates and to provide for the protection of the English traders in the Baltic. The new company had the trade monopoly of the Baltic area, as far as

Englishmen were concerned. Only those engaged in the Baltic trade in 1568 were admitted. Curiously enough, in the case of both the Spanish and the Eastland Companies the great merchants of the Merchant Adventurers' Company were given admission on easy terms. There is reason to believe that the organization of the Levant Company was another instance of the efforts of a small group of traders to exclude all others from a trade originally open to all Englishmen. The Levant Company had only twenty members (including the queen). Its monopoly of currants brought in extremely large profits. Currants and raisins, previously worth a penny, wrote Parson Harrison in 1586, now "are holden at six pence." "I do not deny," he went on, as he complained of the high prices of imported wares, "that the navy of the land is in part maintained by their traffic, but so is the price of wares kept up, now they have gotten the only sale of things upon pretence of better furtherance of the common wealth, into their own hands."

Still another example of the restrictive effect of a commercial monopoly upon trade may be found in the history of the way in which the Merchant Adventurers managed their monopoly of the export of white or unfinished cloth. "At every crisis of their history we find their influence at work as a restriction upon the export of cloth." Thus, for instance, the Hanseatic merchants continued during the early years of Elizabeth's reign to export considerable quantities of cloth. At times, when the Netherlands trade was cut off, they afforded a needed outlet for English production. On the basis of ancient rights, the Hanseatic merchants insisted on buying at Blackwell Hall, the great gathering place of the manufacturers, and by their credit arrangements with the clothiers they provided one of the necessary elements in the expansion of the cloth industry. In 1576, through the efforts of the Merchant Adventurers, they were excluded from Blackwell Hall, and in 1580 all their privileges in England were abrogated. The result was a definite restriction on the export of cloth.

The suppression of the Hanseatic trade coincided with the establishment of the Spanish, Eastland, and Levant Companies. But these new companies did not open new channels of trade; they restricted those already open. Their policy in this matter was initiated in close cooperation with the Merchant Adventurers.

The Merchant Adventurers went further in their restrictive

measures. They even checked the enterprise of their own members, limiting their transactions to a certain number of cloths, which varied with their years of membership, and punishing infringements of their regulations by fines. After the suspension of trade at Antwerp in 1564, and again after permanent closing of the port in 1575, the Merchant Adventurers made their way to various towns in Germany, such as Emden, Cologne, Frankfort, Hamburg, and Stade. Although they could not completely exclude other English merchants from Germany, since their charter did not cover the German trade, they did restrict their own members to trade in the town in which for the moment the company had its headquarters, and they sought to prevent further penetration of Germany by English enterprise.

In the midst of the trade depression of 1586-1587, many clothiers were unemployed, and the poorer sort, who lived by spinning, carding, and working of wool, were starving for lack of work and were on the eve of rebellion. Bristol and Southampton were said to be falling into decay. "This great matter of the lack of vent [sale]," wrote Lord Burghley to Sir Christopher Hatton, "not only of cloths, which presently is the greatest, but of all other English commodities, which are restrained from Spain, Portugal, Barbary, France, Flanders, Hamburg, and the States, cannot but in the process of time work a great change and dangerous issue to the people of the realm, who heretofore, in time of outward peace, lived thereby, and without it must either perish for want, or fall into violence to feed and fill their lewd appetites with open spoil of others, which is the fruit of rebellion."

Burghley's remedy was more sales, more buyers, and more ships. He proposed to restore the Hanseatic trade, permitting the Steelyard merchants to export white cloth. Other aliens were to have the same permission and were to be encouraged to trade by lower export duties. Blackwell Hall was to be opened to foreign merchants. Finally, the exportation of cloth was to be thrown open to all English merchants, whether or not they were members of the Merchant Adventurers.

The council adopted Burghley's proposals, but London resisted them. Sir Rowland Hayward of the Merchant Adventurers and Sir Edward Osborne of the Levant Company were sent by the city to protest before the Privy Council, and the city merchants organized a boycott of the government's measures which pre-

vented them from being effectively carried out. Restriction continued to be the order of the day, and commercial monopoly continued to check industrial expansion.

Privateering and Looting

As Englishmen of the early years of the seventeenth century looked back upon the recent past of their history, they were struck by the additions made to the national wealth by Elizabethan raids upon the commerce and wealth of Spain. Since that day historians have continued to emphasize the part played in national development by the great seadogs who made the English name a terror on the seas. It is still a matter of common belief that when Drake returned from his voyage around the world, the loot which he had gathered from the towns along the western coast of Spanish America and from the ships which he captured in the Pacific made it possible for him to pay to those who put their money into his venture a dividend of 4700 per cent. Over and above the distributions to the shareholders, large sums were received by the queen and stored in the tower.

It is now possible, because of the availability of certain records in London, to examine the accounts of this and various other ventures of Elizabeth's time. These provide an antidote to the popular views of vast national profits made at Spanish expense. What Drake and his associates made out of the voyage of circumnavigation is not known, since the queen permitted Drake to take the coined silver which he brought back with him and £10,000 "at his own choice." His takings were limited only by his conscience, which was not overactive in a matter of this sort. The queen took 22,899 pounds weight of silver bricks and bullion, 512 pounds weight of silver called cozzento silver, and 101 pounds of gold.

On another occasion, when Drake and Hawkins went to attack Cadiz in 1587 and singed the king of Spain's beard, they captured the *St. Philip* carrack, worth, with her cargo, £108,049. The queen and the "venturers" supplied 5025 tons of ships with their equipment together with 2648 men and expended, in addition, £18,733. All in all, there seems to have been a good net profit on this occasion.

On the other hand, the three gold-seeking voyages of Martin Frobisher in the late 1570's to the islands north of the North

American mainland were a dead loss, as were many other Elizabethan ventures, especially those made against Spain after 1588. Quite apart from their reactions upon international credit, the English attacks on Spanish wealth in the new world probably absorbed more capital than the loot which they brought home was worth, and they must be regarded therefore as a deterrent in the story of English economic development rather than a factor making for progress.

Tudor Military Expenditures

While this hypothesis is offered with a certain amount of hesitation because the facts are not all available, there is no doubt whatsoever that Tudor military activities on the continent involved the nation in a long-continued drain of capital, far greater than any compensatory returns of treasure. Had this wealth been conserved and applied to the processes of agriculture and industry, it would have transformed completely the English set-up.

Henry VIII inherited something like £900,000 from his father, Henry VII. By 1522 virtually the entire sum was spent. The major part of it went to equip an army sent to France in 1513, which captured the two cities of Tournai and Théroutanne. Before these cities were eventually returned to France, the maintenance of English garrisons there dipped deeply into what was left of Henry's inheritance. What still remained was expended in subsidies to continental allies.

In the second war with France, between 1522 and 1525 Henry sent one important military force to France and a second to Scotland which cost the nation around £392,000. To keep the picture perfectly in focus, it must be added that from 1475 down to 1534 there were intermittent transfers in the reverse direction in the form of reparations payments from France. Yet these left the net balance still against England. In 1542 Henry VIII's third great war with France began. From its inception to Henry VIII's death in 1547 this war with its companion piece, the hostilities between England and Scotland, cost £2,134,000. Edward VI's government spent an additional £1,386,000 for military purposes, and Mary, renewing the struggle with France and Scotland rather in the interests of her husband Philip than those of her own people, added other large sums to the wealth already

spent abroad in foreign wars by the Tudor sovereigns. The special garrisons maintained against the Scots alone cost Mary £145,000.

It might be well to pause for a moment to examine the effect of the continuing flow of wealth overseas. In one sense the war measures of the period accentuated the development of capitalism, because they assisted in the process of mobilizing large capital sums in the hands of businessmen, such as contractors for supplies, who would use them in large-scale business ventures. On the other hand, the collection of war revenues in the form of taxes, loans, and increased customs took from the English people the chance of using for their own enjoyment and development the wealth they had created. Every pound sterling spent for war in France meant that some Englishman was being deprived of the use of something he had created or earned in order to send an equivalent value to be destroyed on the fields of France. Actually, up to the moment of the death of Mary, no questions of English liberty or freedom to develop were involved. As far as any fundamental issues or permanent results go, these wars might just as well never have been fought. Had they not been fought, every Englishman would have been richer.

In the reign of Elizabeth, England's independence was actually threatened. After 1585 Philip of Spain determined to make of England a nation subservient to the interests of Spain. War expenditures after this time may be regarded as investments in political liberty and therefore not subject to discussion along economic lines. It is not certain that this generalization applies to the earlier wars of Elizabeth's reign, such as the war in Scotland in 1560 or another war with France in 1562-1563, or to the wars for the conquest of Ireland, which were pretty clearly wars of aggression. Even the great war for independence from Spanish domination might have been avoided if Elizabeth had been willing to curb her own aggressors who kept insisting upon their right to loot Philip's American treasure houses. There is thus a direct connection between Drake's 4700 per cent and the 22,000 pounds weight of silver and the 101 pounds weight of gold which Elizabeth took from the hold of the *Golden Hind* and the millions of pounds of treasure which were consumed on the battle fields of Flanders and France in the Elizabethan war against Philip.

There is a paper drawn up shortly after the death of Elizabeth

which gives the costs of Elizabeth's wars. Though not altogether complete, it may be used as a convenient summary. It includes the following items:

The War in Scotland, 1558-1560	£ 178,820
The Newhaven Expedition (the campaign of 1562-1563 to capture Havre)	246,380
The Suppression of the Norfolk Rebellion in 1569	92,932
The Conquest of Ireland, to 1573 (the suppression of the O'Neils)	230,440
The Conquest of Ireland, to 1579 (the Desmond Re- volt)	254,961
Aid to the States of the Netherlands, 1585-1590	663,854
The Armada	161,185
Various privateering expeditions, 1589-1597	182,260
Aid to the Netherlands, 1590-1597	755,746
Expeditions to France, 1591-1593	377,480
The Conquest of Ireland, 1593-1603	1,924,000

The total amounts to £5,068,054. Large as this sum is in terms of sixteenth-century values, it might have been a less serious drain upon English resources had it been distributed evenly throughout the forty-four years of Elizabeth's reign. Actually over £3,000,000 was spent during the decade 1590 to 1600; and the economic distress of this time is a reflection of the heavy drains of the country's surplus into economically unproductive military operations. Nothing is said in these accounts of the loss of manpower, which was also very heavy. By way of keeping the dimensions of things in mind, it might be noted that £3,000,000 spent in ten years was scarcely one pound sterling per head of population over that period. Yet in an age when the surplus of accumulation over the actual necessary consumption of the people seems still to have been small, even such a loss may have had serious reactions. By way of comparison, the Muscovy Company had a capital of £6,000; the East India Company, one of the largest commercial undertakings of the Tudor period, represented an initial investment of £30,133. The ill-fated Drake-Hawkins expedition to the West Indies in 1595-1596 was capitalized at twice this sum. In any case, if there was any economic significance in the loot brought home by the freebooters and privateers, there must have been far greater significance in the treasure poured out by the Tudors for military purposes.

Tudor Interest in Colonies

There is still another form of overseas economic activity during the Tudor period which must be noticed. Like the military operations on the continent and in Ireland, the Tudor colonies represented capital losses, which may, however, be regarded as costs of preliminary surveys looking toward the more successful colonial ventures of the next century. These colonies were undertaken in Ireland and in America, and in each case they failed. In Ireland the government entertained the idea of permanently breaking Irish opposition by seizing the land and granting it to English colonists who were to settle in the country. Colonizations of this sort were attempted in Ulster in 1567, and in Munster in 1569, but led to nothing beyond embarrassing the "undertakers." The elder Earl of Essex and Philip Sydney, the poet, were both interested in ventures of this kind. In America, the leading impulses to an interest in settlement were the search for treasure and the discovery of the northwest passage to India. The Frobisher voyages of the late 1570's combined both features, and later navigators, such as Baffin and Davis, continued the heroic deeds of English sailors in the icy waters north of North America. In 1578 Sir Humphrey Gilbert wrote a little pamphlet to prove the existence of a northwest passage. In it he suggested a permanent English settlement in the New World. Gilbert had already secured a charter authorizing him to found a colony, and in 1579 he set out at the head of an expedition to accomplish this purpose. The expedition turned warlike against the Spanish West Indies and accomplished nothing. In 1583 Gilbert led another expedition to Newfoundland, on which he lost his life. In the next year his half-brother, Sir Walter Raleigh, who had inherited his rights, sent out explorers to make a survey and then dispatched an expedition to effect a settlement on Roanoke Island. In the following year Drake picked up the survivors, who had spent their time harrying the Indians and seeking for gold. In 1587 Raleigh sent out another company of 150 men of whom seven were found alive, living with the Indians, twenty years later.

SUGGESTED BOOKS FOR FURTHER READING

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Chapter 10

PUBLIC FINANCE FROM THE BEGINNING OF THE NORMAN TO THE END OF THE TUDOR PERIOD

THE GOVERNMENT of a people is in the last analysis that corporate form through which they give expression to their common aspirations and provide for common needs. For the maintenance of government common contributions are necessary. In the past such was the unrighteousness of most human kind that they endeavored to shirk that responsibility to the utmost. Eventually, of course, there is no avoidance of the burden of supporting the government. Everyone must contribute, but if the contribution can be disguised or concealed, can be taken indirectly rather than directly, even in modern times it seems less painful. In the Middle Ages direct levies of government costs upon the individuals of the nation were the exception rather than the rule. The right of the government to use these direct levies was actually denied in theory. "The king must live of his own," was the notion current not only throughout the Middle Ages, but well into modern times. It was not until after the Revolution of 1688 that Englishmen accepted full responsibility for maintaining their political institutions.

Feudal Public Finance

One interesting aspect of the study of public finance in the Middle Ages is an examination of the ways in which kings avoided direct, in favor of indirect, levies. They were assisted in their program by the fact that the kings of the Saxon period were large landowners, living from the produce and income of their farms.

The Norman kings continued the tradition. William the Conqueror kept for himself 1422 manors scattered throughout England, the income from which was (wrongly) said to be 1060 pounds, 30 shillings and 3 obols each day. The sale of wood and the leasing of the pannage for swine in the royal forests brought in substantial amounts.

As an incident of William's conquest of England, much of the land of the country passed into his ownership. Large extents of such land were distributed by the Conqueror among his followers in the form of fiefs; and in token of the king's continuing ownership and of the heritable possession of the new occupiers, they were obliged to make certain payments to the Crown. These "feudal dues," consisting of military services, money payments, and attendances constituted a very important part of the Conqueror's revenues. That they were paid as rents to a leader who had bestowed rich rewards upon his followers does not alter the fact that they were indirect levies upon the nation as a whole for the support of the state. William and his immediate successor extended to the estates of corporations of the church, such as monasteries and bishoprics, the idea of a royal interest in the land of the kingdom, endeavoring to treat these in a way analogous to lay land, even though there was no question of actual conquest of such property. Many church corporations were obliged to pay the king dues similar to those paid by the lay lords.

In addition to feudal dues the Norman kings participated in the fees and other collections made in the county courts. They received payments known as the *firma burgi* in lieu of customary services from the people of the towns, and made considerable profits from the sale of charters to the towns. Waifs, or goods thrown away by a thief in flight, strayed animals, wrecks, whales and great sturgeons cast up on shore, and treasure trove belonged to the king. He had the right, furthermore, to impress conveyances and horses for the use of his court and to buy household supplies at fixed prices. The only tax in the modern sense used by the Norman kings was the Danegeld. This was levied only at irregular intervals and consisted of the payment of a certain number of shillings on every hide (120 acres) of such land as was included in the assessment lists.

William the Conqueror used the sheriffs as his fiscal agents. They collected the king's rents and his share of the fines in the

courts accruing in their respective counties. By the time *Domesday Book* was compiled the sheriff was paying a sum known as the farm of the county in composition of the actual amount which he collected from these sources. The sheriffs also collected the Danegeld in such years as it was imposed and some of the feudal payments due from the tenants-in-chief who held land directly from the Crown.

During the reign of William the Second, the Conqueror's son, royal attempts to exact increased feudal contributions by arbitrary measures led to great opposition both from the lay barons and the ecclesiastical dignitaries, but Henry I, his successor, by regularizing such exactions, perhaps without substantially reducing them, won acquiescence in them. Henry I's financial adviser was Roger, Bishop of Salisbury. Bishop Roger set up definite scales of payments and provided for the regular audit of the accounts of all persons handling royal money. The fiscal bureau was known as the Exchequer. Here a recent invention, the abacus, in the form of a table divided into columns, was used in casting accounts. The abacus was really a counting machine designed to make use of the principle of the decimal system at a time when the duodecimal system of notation and Roman numerals were still in common use. From the resemblance of the accounting table to a checker board, the office came to be called the Exchequer, and here, twice a year, at Easter and Michaelmas, the sheriffs paid their collections and compositions, rendered their accounts, and received their quittances.

William the Conqueror was believed to have given the problem of increasing his income so much attention that his contemporaries declared he was "given to avarice and greedily loved gain," while a modern historian has declared that his subjects groaned under his exactions. He actually ordered an economic census of the wealth of the kingdom which, concluded in 1086, was compiled in *Domesday Book*. On the basis of the facts thus ascertained Ranulf Flambard, Bishop of Durham, justiciar of William II, devised larger revenues. Flambard's measures seemed outrageous to contemporaries and were denounced by the chronicler Odericus Vitalis, who said that he and his minions "were robbing England and, worse than thieves, pillaged without mercy the granaries of the farmers and the stores of merchants, not even restraining their bloody hands from plundering the church."

The necessity of the king's finding new revenue either to replace failing sources of supply or to provide for mounting expenditures is one of the leading features of English public finance during the following centuries. The second is the coloring or concealment of popular reluctance to pay beneath assertions of royal avarice and extortion as indicated in the quotation given above.

One of the first serious crises in royal finance developed during the reigns of Henry II (1154-1189), Richard I (1189-1199), and John (1199-1216). Owing to a considerable rise in prices which began during the twelfth century, there was a decrease in the real value of all such revenues as were made in fixed money payments. The problem was to make good this depreciation and to provide for the mounting costs of supporting military operations in a society where the leading feudal elements were more and more inclined to throw off the suzerainty of their overlords, and the kings were seeking to recover many of the privileges and rights that they had previously granted to their vassals. Henry II commuted military services into money payments known as scutage. He introduced a direct tax, which was known as *carucage*, levied against personal property as an alternative to the *Danegeld*, and he began the collection of all sorts of fees and fines and the sale of all sorts of special privileges. Among these was the right to be tried in royal courts by a superior form of procedure in which a jury was used, provided a proper royal writ was purchased from the Crown. Richard sold town charters and is said to have declared he would have sold London itself if he could find anyone rich enough to buy it. John, worse off than his father or brother, increased to the utmost the feudal payments of the tenants-in-chief. His "abuse" of the royal rights of wardship, marriage, and relief, his exactions of new taxes equivalent to large fractional parts such as a thirtieth, a seventh and even a fourth of his vassal's incomes, and the diversion to his own treasury of the incomes from property of the church led to united action against him on the part of the feudal nobility and the great churchmen. As a result he was obliged to sign *Magna Carta*, which was to restrict his exactions and protect his subjects against his extortionate measures.

Yet *Magna Carta* ended neither the rise in prices nor the pressure of new demands upon the Exchequer. These factors contributed to the unsettled state of the country in the reign

of Henry III. During the same period certain fiscal experiments were undertaken looking toward a solution of the matter. Applying the psychological fact that men in a group are less inclined to be stingy than the same men consulted alone, Henry III's ministers took to having the king's growing necessities explained before the congregated magnates of the counties, before city gatherings, and before national assemblies in which various sorts of people who might be willing to make contributions to help the king would be present. In such assemblies, the most solemn of which came to be called Parliament, various kinds of taxes and contributions were granted to the Crown from time to time. Yet since these taxes were not recurring they never did more than provide assistance on a specific occasion. Many years often intervened between one grant and another. There was no recognition of taxes as a regular feature of national finance. Moreover, grants of taxes were invariably attended by demands on the part of the people who voted them for special concessions in their favor. Knowing that such concessions would have to be made, the Crown was reluctant to ask for tax grants except when it was in the direst need.

During the reign of Edward I (1272-1307) a real improvement in the king's finances was affected by the introduction of a national system of customs duties collected for the benefit of the Crown. The first schedules, introduced in 1275 and known in later times as the *Custuma Antiqua*, or the Old or Great Custom, levied a duty of 6s. 8d. upon the export of each sack of wool, 13s. 4d. on each last (twelve dozens) of hides, and 3d. upon each pound of lead or tin.

In 1294 war broke out between England and France and Scotland. In the years which followed, the fiscal situation was often very serious. Edward's natural inclination was to exploit to the limit the collection of levies on trade which had proved so successful during the past twenty years. The duties of 1275 had been introduced with the consent of the merchants, who paid the dues, along with the magnates of the council. The new duties which Edward now levied, particularly those which took the form of heavy duties or *maltotes* on exported wool, seem likewise to have been consented to by groups of merchants. Thus in 1294 the consent of the merchants to increased levies was obtained. In 1297 the difficulties arising from the preparation of a military

expedition to the continent led the baronial opposition party to raise a constitutional struggle. On the ground that the new wool duties seriously injured themselves, they forced Edward to repeal this necessary but unwelcome innovation. They accompanied the repeal with several general statements of their views of the constitutional questions involved. One of these, known as the *Confirmatio Cartarum*, was accepted by Edward I. This Confirmation of the Charters, after abolishing the current maltote of 40 shillings a sack, provided that Edward might reimpose it if he got the consent of the greater part of the nation.

The *Confirmatio* was drawn up and imposed on the king primarily to secure the abolition of the present maltote. It did not introduce the idea that consent was necessary to taxation, since the consent of those who paid was a recognized feature of the medieval constitution. The real problem was the determination of exactly who paid this tax. Edward insisted that the wool duty and other customs were paid by the merchants and that their consent alone was necessary. The baronial opposition party, however, held that the duty damaged the nation, that therefore the nation indirectly paid, and that the national consent in the form of parliamentary approval of new duties must be obtained. Out of the conflict of views there grew a sharp constitutional struggle, in the course of which the barons brought accusations of unjust dealing against the king. Yet the Crown seems to have had the law and the constitution on its side, as is indicated by the events of the next few years.

In 1303 Edward sought to impose another set of new customs duties. The native merchants refused their consent in view of the fact that at the moment there was no concession which they could think of demanding. The foreign merchants, in return for greater privileges, as set forth in a *Carta Mercatoria*, agreed to pay in addition to the great custom a duty of 10s. upon a sack of wool, 20s. on a last of hides, 2s. on a tun of wine, from 12 to 18d. upon cloths, depending on their quality, and 3d. on the value of every pound's worth of general merchandise imported or exported by them. The Crown also continued to levy maltotes upon wool exports with the consent of the merchants.

The renewal of war between England and France in 1336 again brought the fiscal problem to the fore. The king was again obliged to seek money from the people of the nation. In 1332 the oppo-

sition elements had effectively checked any development of the taxes on personal property upon which Edward I and Edward II had to some extent relied. These were known as *tallages*, and in this year accusations of unfairness and fraud were raised against the commissioners who assessed men's property for the levy of the tax. Much friction resulted. In 1334 the commissioners were authorized to compound with the towns and counties for a sum which they were prepared to pay in lieu of an actual assessment of their goods. This composition was accepted in all future levies, and the "fifteenth and tenth," as the tax is now known, became a fixed grant of about £39,000, with a tendency downward as exemptions from payment were granted in later years. In view of this situation, in 1338 Edward III turned to the *maltotes*, the heavy customs duties on wool. In 1340 the king, recognizing that the *maltote* could be more effectively collected if he yielded to the opposition's demand that the levy should be sanctioned by Parliament, agreed to a re-enactment of the *Confirmatio Cartarum* accompanied by parliamentary approval of the *maltote* for a certain period. The grant was made in the terms used for recurring taxation, as though it was now recognized that this was to be a regular tax. The constitutional issue was decided in favor of Parliament by a clause which required that a relevy of the tax must be sanctioned by the magnates and commons in a full Parliament.

Actually, in 1342 and again in 1346, the king resumed the practice of levying *maltotes* with the assent merely of the merchants and of the magnates of the council. Yet protests were made by the Parliament on the ground that, since the tax fell on the native seller and not on the foreign buyer, the nation in Parliament ought to consent to any such taxes before they were laid. In 1348 and again in 1363 the king conceded the parliamentary claim, and thus the principle of parliamentary approval was established. Parliament recognized the need of some national assistance to the king at least in time of war, and in addition to voting certain fifteenths and tenths and other direct taxes, they approved of a new set of customs duties, known as the subsidies of tonnage and poundage and of wool, woolfells, and leather. These duties were substitutes for the *maltotes* and were imposed in addition to the great and petty customs. They were granted for specified periods for the conduct of war. But as the grants were regularly renewed

and then, after the Battle of Agincourt in 1415, were made to the king for life, they became part of the regular Crown income and were used for any purpose for which the king might require them. The fifteenth and tenth, however, which became a levy on land after the events of 1334, remained an exceptional tax, granted by Parliament for collection in certain years, nearly always to meet war expenditures.

Direct Taxes

As a subsidy in the event of war the fifteenth and tenth became more and more unsatisfactory because of its small fixed yield and because of the reluctance of the men upon whom it was assessed to pay it even after Parliament was induced to make a grant. Experiments were begun even before the end of the reign of Edward III to find a supplementary levy which would at least produce a larger yield and which would bring under contribution the growing wealth of business and industry. In 1377, the year in which Edward III died and Richard II became king, the Crown developed a scheme for collecting a poll tax to be paid by every person over the age of fourteen living in England. Poll taxes were collected in 1377, 1379, and 1381. In the assessment of 1379 the poorest people paid a groat (four pence) each; earls, £4 each; great merchants, £1; and lesser merchants, 13s. 4d. each. The grant of 1381, levied at the rate of three groats upon every person over fifteen, was met by widespread concealment of young persons and false returns as to the number of people in a community. In Suffolk alone 27,000 fewer persons paid the tax than had done so in 1377. The government's attempt to ferret out the evaders was one of the factors which precipitated the great popular rising of 1381.

While poll tax features were contained in later tax measures, the efforts of the Crown during the fifteenth century to implement its tax-gathering power by widening the incidence of assessment took other forms. In 1404 Henry IV, declaring that the tax vote of 1402 was insufficient, received a new grant of 5 per cent of the yearly value of lands and rents in England or, in the case of men without land, of one shilling in the pound (5 per cent) of the value of their personal property. With this grant of 1404 were combined, as was usual, two fifteenths and tenths. Dur-

ing the Lancastrian period, which saw the renewal of the great war with France and was attended by heavy military outlays, various other experiments were tried. There was a tax on house-holders combined with a tax on knights' fees in 1427, a graduated tax on land in 1431, and in 1440 a graduated income tax combined with an act for the resumption of all grants from the royal demesne since the accession of Henry VI. Of all these experiments made during the first half of the fifteenth century, not one was repeated.

Edward IV made two great efforts to change the character of parliamentary grants. In 1463 it was enacted that the £6,000 which had by this time been allowed to be deducted from every fifteenth and tenth for decayed towns should be levied upon the inhabitants of the shires having twenty shillings in yearly value of lands or ten marks in goods. The assessments were to be made by royal commissioners, and the money was to be collected by royal collectors. This attempt to revise the settlement of 1334 was unsuccessful. Edward remitted the £6,000 and agreed to collect the fifteenth and tenth through local officials on the basis of ancient compositions without change.

In 1472 Edward IV made another attempt to change the old order. To pay for the support of 13,000 archers for one year, estimated to cost £118,625, the king received from Parliament the grant of 10 per cent of all issues and profits of lands and tenements, rents, fees, annuities, offices, and other income. The first collection of the tax yielded £31,140. To provide the balance, Parliament, before its prorogation, granted a fifteenth and tenth and arbitrarily saddled £5,383 upon those counties whose certificates of assessment had not been returned in time for the first collection. There was still lacking £51,147 to make up the sum necessary for the pay of the archers. This amount was now assessed upon the counties in specific amounts, and royal commissioners were sent to subdivide the sum assessed upon a county among its inhabitants, levying on the value of goods and chattels, which were to be taxed before any landed possessions. The tax was, as usual, unsuccessful. The House of Commons, stating that "the most easy, ready, and prone payment of any charge to be borne within this realm by the commons of the same is by grants of fifteenths and tenths, the levy whereof amongst your people is so usual although it be to them full chargeable that none other

form of levy resembleth thereunto," prayed the king to remit the £51,147 and take in its place one entire fifteenth and tenth and three parts (three-fourths) of a fifteenth and tenth. The next grant of taxes in 1482 was a fifteenth and tenth in the old form.

The fifteenth-century experiments with direct taxes to assist the Crown in meeting unusually heavy expenditures, especially those for war purposes, were not successful. In the first place, the yield of such taxes was small in comparison with the expenditures they were intended to cover, and no king of the period succeeded in bringing about any very important increase in their value.

In addition to the taxes voted by Parliament and paid by the laity, there were clerical taxes, voted by the church assemblies or convocations of the two ecclesiastical provinces of Canterbury and of York. These taxes were nominally a 10 per cent income tax, but the income on which the tax was based was the income as determined in the year 1291 and consequently had little relation to existing values. Generally speaking, the convocation of Canterbury voted a tenth to the king whenever Parliament voted a fifteenth and tenth or other subsidy. The convocation of York seems to have been less regular in its grants. A tenth of the province of Canterbury was worth somewhere between £8,000 and £11,000, depending possibly on the efficiency of the collectors. The tenths of the province of York were worth perhaps £1,400 each.

The Budget of Henry V

Some notion of the relative value of the various types of Crown income and of the relative importance of the various heads of expenditure may be gleaned from an examination of the balance sheet of Henry V's short reign of nine and a half years. Since this was a period of the great military activity of Henry V's attempt to conquer France, grants of direct taxes by the Parliament and by the convocations were unusually frequent. There were ten and one-half grants made by Parliament, the same number made by the convocation of Canterbury, and eight and one-half grants made by the convocation of York together with one special grant by the stipendiary priests. In round numbers direct taxes brought in £511,900 in the course of the reign. The customs yielded between £46,000 and £52,000 a year, but since vari-

ous pensions and annuities were charged on the customs, the net return available for the king's use was perhaps £41,000 annually. The revenues "in the Pipe," the ancient revenues coming down from the days of William the Conqueror and Henry I, were £15,000 a year gross and £5,000 a year net. The hanaper of chancery, where letters patent were sealed and royal writs issued, yielded £3,000 a year; the mint, £1,000; certain newly acquired estates, of which the most important was the Duchy of Lancaster, the private property of Henry IV and now incorporated with the Crown, brought in £10,000 gross and £7,300 net.

All in all, Henry V received an annual average income of about £110,000 net. Out of this the fixed charges took the following amounts:

The Household	£22,400	
The Wardrobe	13,000	during the first 4½ years
	3,100	during the last 5 years
The Chamber	6,000	
The Civil Service	11,320	in addition to £14,000 in pensions and annuities paid out of revenues before they came to the Exchequer
Public Works	1,600	The largest expenditure under this head was for the building of six bays of the abbey church at Westminster.
The Royal Navy, construction and maintenance, including dockyards	24,337	from July 18, 1413, to August 31, 1422, or £2,570 a year
Garrisons at Calais	25,000	
Garrisons on the Scottish borders	9,500	
The government of Ireland in addition to the revenue there	1,666-13-4	
The garrison at Fron-sac, border fortress of Aquitaine	666-13-4	

At this rate there was left available annually on the average for the purposes of the war in France somewhere around £35,000.

A force of 2000 lances and 6000 archers cost in wages alone, without transport or equipment, £7,500 per month, or £90,000 a year. The £35,000 which Henry had available from his revenues went only a short way to meet the costs of an important campaign in France. Some of his war expenses Henry V met by imposing heavy ransom upon the captured French cities. Rouen, for example, ransomed itself by a payment of 300,000 écus (£50,000). The estates of Normandy voted a contribution in 1421 of £40,000. Then the king borrowed wherever he could find lenders. Thus, in the last year of the reign, the Bishop of Winchester lent him £22,306, which had not been repaid when the king died. Finally Henry simply did not pay his bills when money was not available. He died deeply in debt to ambassadors, captains, soldiers, contractors, and tradesmen, and these bills ran on into the reign of Henry VI until many of the creditors either died or got tired of looking for their money. One of the royal creditors was the Earl of Huntingdon, to whom the king owed £8,157 in wages in addition to prize money. When the Earl was captured at Baugé, he was forced to languish in foreign bondage because the Crown could not pay him the money it owed him with which he might have ransomed himself.

Fiscal Improvement

Some of the possible approaches to the solution of the royal fiscal problem were outlined during the reign of Edward IV by Sir John Fortescue, the greatest writer of the fifteenth century on English political science. He quite definitely rejected direct taxation as a regular feature of royal finance on the ground that taxes impoverished the king's subjects. France was the horrible example of the harm that would come to the Crown if the commons were always kept in poverty by charges for the sustenance of the king's estate. The French people ate apples and drank water and partook of "bread right brown made of rye." They ate no meat, went barefoot, "were gone crokyd" and were feeble, not able to fight nor had they weapons "nor money to buy them withal." The French situation must not be reproduced in England. Taxes were to be kept as emergency measures, to be used only under extraordinary circumstances when the king's own "livelihood" was insufficient, as, for example, in the event of war.

In Fortescue's view the king must still "live of his own." He must be rich enough to put down his overmighty subjects. The best assurance that the king would be rich would be provided by endowing him with great areas of landed property. These could best be acquired by "resuming" or revoking all grants of Crown lands which had been made to the nobility. Such a course, incidentally, would "clip" the nobility. Future fiscal embarrassments could be avoided by strict limitations upon all such giving away of the king's livelihood as had taken place in the past.

Fortescue was, of course, merely rationalizing upon the developments of his time. Ever since Henry IV had joined the lands of the Duchy of Lancaster to the Crown, special attention had been given to the matter of creating a new system of royal estates, managed so as to be more productive to the Crown than were the ancient demesnes of the Middle Ages. The Duchy estates were not placed under the jurisdiction of the sheriffs and the Exchequer; they were supervised by a new fiscal organization, the Court of the Duchy of Lancaster. The change of dynasties in 1461 when the Duke of York became king as Edward IV brought the estates of the Duchy of York and of the Earldom of March into union with the Crown. During the disorders and civil wars of the next decade a great deal of the property of the old nobility was confiscated by the king on one pretext or another. It was popularly believed that one-fifth of the land of England was at one time or another in the hands of Edward IV. Whatever the amount was, the king was unable to keep much of what he took because of the necessity of rewarding his own adherents. The first Tudor profited by the experience of the immediate past. Henry VII was the heir of a great congeries of feudal houses, such as the Beauforts, the Bohuns, the Mowbrays, and the Veres; he piled up estates by resumption, confiscation, and escheat; and what he got, he was able to hold. The Crown lands, worth little more than £6,000 a year when he mounted the throne, yielded more than £30,000 a year at his death.

The Tudor Crown Lands

All the Tudors continued to use landed estates as one of the main elements in their fiscal system. In addition to the income from land acquired and held directly, Henry VII insisted upon

all sorts of other payments into his treasury, which eventually were derived from land. Thus the old feudal rights of wardship were revived; and from 1485 to 1642 a growing income was received by the Crown from the profits of estates in the king's hands because of the minority of heirs. During the vacancy of the great church offices the king insisted upon taking over the income of the estates and compounding with the new incumbent for the restitution of his temporalities.

In spite of the recognition of the evils that attended the attenuation of Crown lands by grants and alienations, in the early days of Henry VIII's reign there was a tendency to give rewards to favorites in the form of land grants. This occurred at the very time when the acquisition of additional property by the confiscation of the land of nobles was only occasionally possible, because there were no more rebellions of the nobility. For a time it seemed as though the Tudors must find something else beside land upon which to base their revenue policy. Wolsey, in the last years of his administration, actually endeavored to find the requisite increases in revenue in the manipulation of certain "pensions" or reparations and indemnity payments from the king of France. But reparations and indemnities soon proved to be a broken reed, since the king of France took the earliest opportunity which diplomatic developments afforded to refuse to make further payments.

During the middle third of the sixteenth century (1535-1563) the development of the religious question in England in connection with the separation from Rome, the establishment of royal supremacy over the English church, and the introduction of Protestant doctrines made it possible for the Crown to bring about the second Tudor increase of Crown lands, at the expense of the church corporations. Henry VIII, with the assistance of Thomas Cromwell, suppressed the monasteries and friaries and annexed their property to be a permanent endowment of the Crown. Actually the Crown was soon compelled to offer much of the monastery land for sale to provide ready cash to meet the costs of military preparations and of foreign war, so that at the time of the death of Henry VIII perhaps seven-eighths of the monastery land had been sold. Edward VI's government suppressed and took over the property of the chantries and of the religious gilds. Elizabeth's advisers arranged what was on the surface an exchange

of certain kinds of Crown property for lands of the bishops. This was in reality a veiled confiscation, made somewhat painless by the fact that it was carried out in the case of the individual bishopric during the time that the see was vacant.

The policy of selling Crown lands for ready cash, which Henry VIII had instituted, was resorted to at intervals by his successors. At any critical juncture when money was scarce and could not be obtained from any other source, Crown lands might be offered for sale. Thus Elizabeth sold land during the first few years of her reign to pay the debts of her sister and to meet the expenses of wars with Scotland and France. After that, sales virtually ceased until 1589, when the cost of helping the people of the Netherlands against Spain was met in part by offering land to any who wanted to buy. Large sales were made in 1591, 1599, and 1601 to meet in part the costs of fighting Spain. Elizabeth derived £876,000 from the sale of estates which had a yearly rental value of about £25,000 annually.

In spite of the alienations made by Henry VIII and his children, the Crown lands steadily rose in value, either through new acquisitions which continued to be made even throughout Elizabeth's reign, through greater efficiency in management, or through increases in the rents or fines. The clear net yield of the Crown lands in the first year of Elizabeth's reign was £66,448; in the last year of the reign, £88,767. Yet by 1603 the Crown lands were relatively less important than they had been in the middle of the century, because other forms of revenue had increased in value more rapidly than they.

The Customs Under the Tudors

Something has already been said about the yield of the Tudor customs. The figures given above provide an indication of the growing importance of the customs in the Tudor revenue system. They were regarded by the Tudors as the second basis for their fiscal policy.

Henry VII made little change in the customs. He collected the great customs and the petty customs as part of the ancient rights of the Crown, and he received the grant for life of the subsidies of tonnage and poundage and of wool, woolfells, and leather from Parliament at the beginning of his reign. Reference already

has been made to his efforts to stimulate trade both by reciprocal trade treaties and by loans to merchants. He disliked the special privileges of the Hanseatic merchants but could do little beyond trying to make certain that they did not take other merchants' goods through the customs house as their own in order to make possible the payment of the lower rate of duties to which the Hanse was entitled. The two most significant innovations of Henry VII were the introduction of a new duty on Venetian wines and the setting up of a book of rates for the port of London.

The circumstances of the imposition of a new duty on Venetian wine have already been described. The levy had popular approval since it was a retaliatory measure designed to force the Venetians to remove a similar duty on wines exported from Venetian territory in ships other than Venetian. Yet the most significant thing about the new wine duty was that it was not authorized or approved by Parliament; it was levied by the king by virtue of his prerogative. There was thus created a precedent for the introduction of new impositions in the future in the same manner, without parliamentary participation in the matter. It is true that the lawyers held that such new levies must be for the good of the nation (*pro bono publico*) and not merely for the profit of the Crown. What king could not find a plausible explanation for any new tax in terms of the general welfare? Henry VIII continued to collect the "new custom" on wines of Venice from foreign merchants at the full rate of 18 shillings per butt; the rate for English merchants was 6s. 8d. per butt.

While certain of the customs collected in English ports were "specific," levied, for example, at so many shillings on a piece of cloth, a very large part of the duties were "ad valorem," that is, they were levied at a certain rate or percentage on the value of the merchandise. During most of Henry VII's reign, as in the past, the valuation of goods imported and exported was made by the merchant to whom the goods belonged, and the duty was paid on the amount which he declared as the value of the consignment. Henry VII began to doubt the accuracy of some of the merchant declarations, and in 1507 he prepared for use in the port of London a book of rates, in which the official valuations of most products entering into commerce were set down. The duties were in the future to be paid on these official valuations.

In 1536 and 1545 Henry VIII extended the use of the book of rates to all English ports.

The possibility of increasing the yield of the customs occupied the attention of government officials during the reigns of Edward VI and Mary, and eventually in 1558 a series of new customs regulations and schedules were adopted. On the plea that the duties on cloth exported were too low in comparison with the duties on wool and that as cloth export grew at the expense of wool export the Crown lost its proper income, Mary's government increased the cloth export duty payable by Englishmen from 1s. 2d. to 6s. 8d. per short cloth, with other cloths in proportion. The duty payable by aliens was raised from 1s. 9d. to 14s. 6d. per cloth. In the next place an "imposition" was placed on French wines imported, at the rate of 26s. 8d. per tun, on the plea that this was a composition for non-observance of a royal proclamation prohibiting the import of French wines. An impost of 10s. per tun was placed on beer exported, and one of 12d. in the pound sterling of value on dry wares imported from France. Somewhat earlier a new imposition of 20s. per butt payable by aliens was laid on sweet wines not imported through Southampton. Finally, on May 28, 1558, a new book of rates was issued, raising the valuations fixed in the book of 1507 to the current figures.

Elizabeth's government took over the various innovations made by Mary. The book of rates of 1558 was used, with revisions, throughout Elizabeth's reign. The new duties on French dry wares were soon given up, but the other impositions were continued, although contested by the merchants in the courts. The cloth duties remained as Mary had fixed them; the beer impost was raised to 13s. 4d. per tun, and the French wine imposts to 53s. 4d. per tun for aliens and 50s. 4d. per tun for native merchants.

In order to obtain increased revenue, during the course of her reign Elizabeth occasionally resorted to new impositions or customs duties levied without the sanction of Parliament. In 1573 the queen commanded that a new imposition, similar to that levied by Mary upon French wines, be laid on sweet wines "of the growth of" Spain and the Levant. Again in the period 1599-1601, when funds were unusually short, the queen's council laid impositions on sea coals exported or carried from Newcastle to

London, and upon currants imported by the merchants of the Levant Company. There seems to have been no settled policy as yet to introduce new customs impositions generally as an important element in royal fiscal arrangements. Rather, when needs were pressing and an opportunity offered, a new imposition was imposed.

As far as increasing the yield of the customs revenues is concerned, the chief reliance of the later Tudor officials was upon administrative changes which would guard against fraud, would give incentives to efficient collection, and would prevent fluctuations in receipts. There was, in consequence, a reorganization of the customs service in Elizabeth's reign, and the beginning of the leasing or "farming" of the collection of some of the customs revenues. The "farmers" paid a certain rent to the Crown over a certain period; and, on the renewal of their leases, it was expected that any rises in collections would accrue to the benefit of the Crown through increases in the rents. The various kinds of duties, such as the sweet wine duties, the French wine duties, the duties on imports in London, and the duties paid at the other ports outside London, were farmed by separate contracts. The duties on exports from London were collected by the queen's officials and were not farmed at any time by Elizabeth. Farming began in 1567; between 1588 and 1600 there was a tendency not to renew the leases as they fell in and to resort to direct collection through the customs officials. In the last years of Elizabeth's reign there was revived attention to farming, which was a kind of prelude to the great customs farms of the Stuart age.

The Direct Tudor Taxes—The Tudor Subsidies

The Tudor government officials were steadily interested in all sorts of minor sources of revenue. Almost anything which might be made to yield a little money was studied and put into practice. Thus, in Elizabeth's reign, the Exchequer collected tonnage dues for the repair of Dover Haven, fines from recusants for refusing to go to church where the Anglican common service was used, payments for licenses to export wheat and ordnance, levies to equip and support military forces, fines of leases, and other similar payments. The chief reliance, however, all through the Tudor period, for revenue to eke out extraordinary expenses, especially

in the event of war, was the collection of direct taxes from the clergy and the laity.

Down to 1535 the clergy in their convocations continued to grant tenths as they had done throughout the later Middle Ages whenever the Parliament voted a direct tax upon the laity. In the year 1535, as part of the program of the extension of royal authority over the English church, Parliament voted that an annual tenth, based on a new valuation of incomes, was to be paid by the clergy in the future. The annual clerical tenth at first yielded about £25,000 a year, but after the suppression of the monasteries the annual tenth declined to about £12,000 annually. On top of that came special levies voted by Parliament, generally in connection with lay taxes, of 10 per cent or of multiples of 10 per cent upon the remaining 90 per cent of the incomes of the clergy. At the same time that the annual tenths were imposed on the clergy, the first fruits which were previously paid by the great churchmen to the Papacy were transferred to the Crown. As a result of these three-fold payments the clergy were taxed more heavily than the laity for the support of the state.

The lay taxes voted by Parliament took two forms, the ancient fifteenth and tenth and the Tudor subsidy. The Tudors actually succeeded after many experiments between 1485 and 1515 in working out a new form of direct tax, which was levied upon income derived from land and upon movable property in the sense of net capital. As finally fixed the new subsidy was assessed at the rate of four shillings in the pound of the annual value of land and of 2s. 8d. in the pound on the value of personal property. The property of greater value was selected for assessment, but no one was assessed on both his lands and goods. Assessments were made on oath down to 1563, but declarations of the taxpayers were accepted for all later levies. Aliens paid at double rates, but if they had no property they paid a poll tax. Royal commissioners supervised the assessment and collection of the new tax.

It soon became the established practice to combine one subsidy with two fifteenths and tenths in a parliamentary grant. In 1589 two subsidies and four fifteenths and tenths were voted; a triple grant was made in 1593, and this was repeated in 1597. In 1601 four subsidies and eight fifteenths and tenths were voted. While the fifteenths and tenths continued to decline steadily,

though slowly, in their yield, the subsidy rose rapidly in value to 1571 and then began to show a slow decline as far as the amount collected from each subsidy was concerned. At the same time, under the pressure of the war with Spain, the English people were forced to pay taxes year after year, instead of only occasionally, and as the collection time of each grant was steadily reduced after 1589 the amount which Englishmen paid each year tended to increase. In the year 1601 the queen collected, from the various grants then current and due, the sum of £169,748. From this year on to 1611, when this period of multiple grants came to an end, the annual collections declined.

Edward IV's announcement in 1467 that he intended to live upon his own and not to charge his subjects except in great and urgent causes was interpreted as meaning that taxes were intended for emergencies of which war and rebellion were the chief. The early Tudors accepted this view, and there was the closest correlation between tax grants and internal rebellions or foreign wars. In 1566 William Cecil made the proposal that a subsidy should be granted in time of peace to clear up old debts, as part perhaps of a more general purpose on his part to use subsidies as a regular feature of the fiscal arrangements of the queen. So strenuous was the opposition to the subsidy vote on this occasion, that to save the day the queen cut down the rate of payment by one-third, took men's declarations without oath as to their "values," and appended only one fifteenth and tenth, instead of two, to the grant. The Crown collected only £118,000 from this subsidy and its accompanying fifteenth and tenth, and Elizabeth's government did not again attempt to collect taxes for anything but war purposes.

Although subsidy votes were limited to the provision of emergency resources in the event of war or rebellion, there was no corollary principle that the costs of the war in question were to be defrayed entirely by the subsidy grants. As a matter of fact, even in the 1590's when the appropriations reached their maximum productivity, the grants by Parliament met only a fraction of the costs of military operations. The balance was met from the queen's revenues.

Although the amounts of money actually received by the Tudor sovereigns from taxes were very considerable, in the larger view the experience of the Tudors with the subsidy must be accounted

their greatest failure. They did not succeed in persuading their people to look upon the subsidy in any other light than as an exceptional grant to meet expenses of war or defense. Although Elizabeth did collect a direct tax in every year after 1589, she could not divorce the collections from military needs; and as soon as the war ended in 1604, the Parliament undertook to end subsidy appropriations. Since it now appears that direct taxation provided the only possibility of producing a revenue adequate to state needs, the success of Parliament between 1603 and 1610, during the early years of James I, in putting a stop to the collection of regular subsidies meant eventual financial disaster for the Stuart monarchy. Had Henry VIII really grappled with the problem of subsidies during the 1530's instead of taking the easier path of confiscating monastic estates, or had Elizabeth done so during the 1560's, instead of falling back on the estates of the bishops, the Stuart kings might have avoided disaster.

SUGGESTED BOOKS FOR FURTHER READING

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Chapter 11

THE SEVENTEENTH CENTURY

THE SIXTEENTH century during which the Tudors ruled England is often considered by historians as the first century of the modern period. There is some justification for this view on the economic side in the light of the departures made in agriculture, industry, commerce, and finance which have been considered in the last four chapters. The seventeenth century was to carry progress and innovation much further. The population of England increased from 4,460,000 in 1600 to 5,500,000 in 1700. There is every indication, moreover, that a larger number of these people were living on a higher standard of living in 1700 than was the case in 1600. The story of how these increasing numbers of people won their livelihood and provided themselves with more advanced standards of comfort forms the substance of the economic history of the seventeenth century.

It is immediately apparent to a close student of seventeenth-century life that the volume of goods and products available for men's use increased greatly during the seventeenth century. What is the cause of this revolution in production? is the question which is at once raised.

Applied Science

In answering the question which is asked above, it seems necessary to consider two elements; namely, the use of capital and the application of science and invention to the problems of production. During the sixteenth century men had seen so much of the dramatic results of replacing old tools, supplies, and methods by new devices that they now developed a kind of eagerness to spend their money in making changes. The purchase of the new equipment, the construction of new buildings,

the undertaking of drainage work, the building of new ships, and the construction of industrial plants represented the ways in which capital was applied. Improvements in tools, inventions of new machinery, and the introduction of new crops in agriculture and of new processes in industry made up the contributions of science. The combination of capital and science in this century produced what was virtually a new technology, which included a new way of doing old things as well as the making and production of commodities which had been unknown before. Possibly the most striking single example of the working together of capital and science to be found during the seventeenth century is the drainage of the great fens by the Dutch engineer Cornelius Vermuyden after 1621. The work involved the application of scientific knowledge in the field of hydraulics, surveying, and engineering on a grand scale. It represented an investment of much capital and made available for improved farming a large area previously scarcely cultivated.

While the enthusiasm for science and its practical application in the form of invention ran through the seventeenth century, there were many who saw with alarm and misgiving the inevitable results in the field of unemployment. Boyle, himself a great scientist, praised those inventions which both increased employment and raised the standard of living. Yet the new methods of making clocks and watches and other instruments of precision which employed more labor were exceptional. Most inventions abridged labor. They were labor-saving devices, which meant less employment, and against such tools, machines, and processes which cut down the number of those employed there was among many an instinctive reaction. The first English saw mills had to stop working in 1663 because of popular opposition. Riots broke out against the ribbon loom in 1676. The popular sentiment thus expressed was often at the basis of gild and corporation policy. It was believed that "the growth of new inventions and new artificers will infallibly reduce all the old to poverty and decay." Consequently, where corporations were strong enough, they sometimes prevented the introduction of machinery. Thus in 1632 the Girdlers' Company induced Charles I to prohibit the casting of brass buckles, since by the new process of casting one man could do the work of ten men using the old forging process. Besides, the new buckles were brittle. Again, later in the century, when the process of

making briquettes or "burning balls" at Liège was related to the Royal Society, with an account of the thriftiness of the new fuel, which was long-lasting, burned without smoke, and left no ashes, it was objected that this new fuel would cut down the number of colliers employed in carrying coal from Newcastle. Never far absent from the mind of government officials in connection with a new article was another question, that of the substitution of an item made at home for one previously imported on which customs had been paid. On the other hand, the official mind also disliked opposition to innovations which might cheapen exports and so increase customs revenues.

The Spirit of Monopoly

"Are we to suppose," asks Professor Clark in discussing this problem, "that, while the old guilds and the old paternalism shut out the refreshing breeze of invention, the capitalist adventurers opened their windows to it wide?" Actually, the capitalists were themselves caught up in the inherited fear of the danger to established relations brought by sudden innovations in a society expanding only slowly in terms of numbers and living standards. In the reign of Elizabeth the capitalists who started new industries nearly always asked for protection, and the form protection took in that period was the grant of a patent of monopoly. Though the monopoly was invariably used to raise prices, it was not a perfect protective device, since all grants, except in the case of glass-blowing, merely gave the exclusive right to make a certain commodity. The same article could be imported from abroad and sold in England, and the monopolists often neglected manufacturing themselves to go into the business of licensing and trading.

As the administrative machinery of the state improved, devices of economic policy different from the Elizabethan grants of the monopoly of manufacture found greater favor with the capitalists, especially since monopolies had been sharply restricted by the act of 1624. The new departures were the protective tariff and the prohibition of the importation and use of competing goods. Indian cottons, for example, were considered such a menace by the woolen cloth interests that Parliament enacted absolute prohibitions upon their use in England by statutes of 1699 and 1720. The new forms of monopoly, like the old, tended to check enter-

prise. At the same time, in view of the inability of other forms of occupation to absorb men displaced by new inventions, technological changes, and new processes, the continuation of regulative controls must not be regarded as expressions of pure self-interest on the part of their chief beneficiaries, the capitalist industrialists and traders. Even the theoretical writers, who sometimes may be a jump ahead of practice, while praising inventions and technical progress, did not come to grips with any solution for the problem of unrestricted and uncontrolled development. Sprat, the historian of the Royal Society, was indulging in mere affirmation when he declared that "The hands of men employed are true Riches: the saving of those hands by inventions of Art and applying of them to other Works, will increase those Riches. . . . If there be not vent for their production at home we shall have it abroad." But he never explained how the men displaced by a new machine could find other work, except by blaming their failure to do so on Idleness. Various ways out of the dilemma might have been found: the one actually accepted by the eighteenth century was the conviction that the best ends of all would be served if each individual did the best he could for himself under a system of "natural liberty" and universal cheapness. For the seventeenth century, however, corporate monopoly and Stuart paternalism were the controls under which capital and science and invention made their growth.

The Rhythm of Business Development

Reference has already been made, in the discussion of certain phases of Tudor development, to the presence during the sixteenth century of certain periods of marked economic progress, expressed in terms of great trade activity, with years of depression and slackness supervening. The alternation of good and bad times is more clearly revealed in the history of the seventeenth century; and the cyclical rise and fall of business activity may be used in conjunction with political events to make a frame into which to fit the story of economic development.

Politically speaking, the century is divided roughly into three sections, marked off by the beginning of the Civil Wars in 1642 and by the end of the revolutionary regimes of the Commonwealth

and Protectorate in favor of the restoration of the monarchy in 1660.

The death of Elizabeth was followed by the reigns of James I, king from 1603 to 1625, and of Charles I, 1625-1649. The Civil Wars were contests between the king and Parliament for political control. They resulted in the execution of Charles I in 1649 and led to the setting up of republican forms of government dominated by Oliver Cromwell. The resignation of Oliver's son Richard and the ensuing quarrels between the military leaders resulted in the restoration of Charles II, son of Charles I, as king in 1660. James II, brother of Charles II, who succeeded him in 1685, was deposed in 1688 in favor of his daughter and son-in-law, Mary and William of Orange. On William's death in 1702, Anne, the second daughter of James, came to the throne and terminated the line of Stuart rulers by her death in 1714.

The seventeenth century opened in the midst of the gloom and disaster which attended the Elizabethan war with Spain. Shortly after his accession James I made peace with Spain. This was followed by the "seventeen good years" of expanding commerce and general economic progress, 1603 to 1620. In 1618 the Thirty Years' War opened on the continent. Within two years its effects were being felt in England. The crisis of 1620 ushered in a series of years of depressed trade, which were accentuated by English participation in the Thirty Years' War, first as the enemy of Spain and then of France. English military and naval losses were great and except for a partial recovery from 1626 to 1628, trade remained depressed until 1630. In this year famine and the plague stalked the land.

From 1631 to 1636 business improved rapidly following England's withdrawal from the war in Europe. After this year mistakes in governmental policy in the creation of monopolies raised prices. The plague reappeared in London, carrying off 10,400 persons. The Crown rather overdid the business of expanding the royal navy. An attempt on the part of Charles I to coerce his Scottish subjects into accepting religious changes led in 1638 to the Bishops' Wars between Charles and the Scottish people. From 1636 to 1660 times were bad or worse than bad. The Restoration was attended by the return of prosperity, which lasted until 1681, with only occasional lapses from 1664 to 1667 and in 1672. The opening of a great series of continental wars by Louis

THE YEARS OF GOOD AND BAD TRADE, RESPECTIVELY, FROM

<i>Remarks</i>	<i>Good Trade</i>	<i>Depressed Trade</i>	<i>Crises</i>	<i>Remarks</i>
		1559 (end of year)	1558-9	Famine: 1556-8.
		1561	1560	English bills refused abroad.
Trade fair to good.	1562-3		1563 (Aug.) to 1564 (Aug.)	Plague (the number of deaths said to be 20,000), interruption of trade with Flanders, famine.
Trade fair to good.	1565-8	1564 (winter)	1569 (Jan.) to 1574	Seizures of English goods in Flanders, Jan. 1569, followed by failures. Norfolk's insurrection, Dec. 1569, followed by failures. Bad harvests from 1571 to 1574. It is slightly uncertain whether the years 1570-74 should be classed as a part of the crisis or of the subsequent depression.
The eleven good years.	1575-85		1586-7	Babington plot, failures, bad harvest, 1587.
The seventeen bad years—trade depressed.		1588-96	1596-7	Plague, 1592—deaths in London 11,503.
		1598-1602	1603	Famine, 1595-8.
	1603-16		1616-17	Plague, deaths in London, 30,561.
The seventeen good years.	1618-20		1620-5	Crisis in cloth trade.
			1628-9	Effects of crisis in cloth trade, Dutch competition in foreign trade, default of East India and Russia Companies, bad harvests, plague, deaths in London 35,403.
Trade fair to good.	1626-8		1630	Famine, tonnage dispute, plague, deaths in London 1317.
	1631-6		1636-7	Depression through the monopolies of Charles I, plague, deaths in London 10,400.
		1638-9	1640	Seizure of bullion by Charles I (July), of pepper (Aug.), plague, deaths 1450.
Trade very depressed and interrupted through the Civil War.		1642-5	1646-9	Exhaustion of the country through the Civil War, great dearth, high taxation.
		1650-1	1652-4	Losses of shipping in the Dutch War, possibly, too, effects of the Navigation Act.
		1655-7	1659-60	Losses in Spanish War, especially in cloth trade, strain of continued high taxation.

1558 to 1720 (Serious crises being indicated by bold face type)

<i>Remarks</i>	<i>Good Trade</i>	<i>Depressed Trade</i>	<i>Crises</i>	<i>Remarks</i>
	1660-4		1664 (winter) to 1667 (July)	Dutch War, plague (deaths 68,596), Great Fire, Dutch Fleet in the Thames, 1667. Run on bankers.
	1667-71		1672	Stop of the Exchequer, failure of bankers.
Trade very active.	1679-81		1682	Run on bankers occasioned by state of home politics, foreign trade little affected.
		1684-6	1686	Depression in cloth trade, failure of Corporation bank, foreign trade still fairly prosperous.
		1687	1688	Revolution—run on bankers.
Home trade active, foreign trade very depressed through war.	1692-5	1689-90		
			1696-7	The financial strain of the war, exaggerated ideas of the nature of credit, bad harvests, suspension of cash payments by Bank of England, failure of land bank schemes.
Great prosperity.	1699-1700	1697 (end)	1701 (Feb.)	Tension between East India companies, political situation, run on banks and consequent failures.
		1702-3	1704 (Oct.) to 1708 (Feb.)	Losses in the war, financial strain, tension between England and Scotland, fears of a French invasion, run on Bank of England.
		1708-10	1710-11 (winter)	Financial strain of the war, change of ministry.
Return of confidence, relief of the financial strain by conversion of unfunded debt into stock of South Sea Co., 1711.	1712-14	1711		
	1714 (Aug.) to 1715 (Aug.)		1714 (Jan. to April)	Fears as to the succession, reported death of Anne, run on Bank of England.
	1716		1715 (Oct.)	Rebellion.
	1717-18		1717 (Jan.) to March)	Walpole's conversion scheme.
Slackening of trade in 1719, followed by very great speculative activity.	1719-20 (summer)		1718 (Oct.)	Fear of invasion.
			1720 (Sept.)	Panic, following the collapse of speculation.

Reproduced from W. J. Scott, *Joint Stock Companies*.

XIV checked expansion, and times were generally bad again until 1708. The next twelve years (1709-1720) saw great progress; too rapid expansion and excessive speculation precipitated the disastrous crisis of 1720.

In a general way, it seems probable that there was little actual retrogression involved in a period of depressed trade. Rather, the expansion of the immediate past was retarded. Shortage of food due to famine and excess stocks of goods piled up by the wartime closing of foreign markets or by the stoppage of business owing to the presence of the plague, dislocated the normal course of economic life. After a shorter or longer time famine conditions ended, the plague ceased, and with the resumption of consumption business entered upon a new period of prosperity. Probably the only time when there was a genuine backward step was during the Civil Wars and the time of the Commonwealth and Protectorate. Much destruction was wrought by the opposing armies. Prince Rupert's privateers sank ships laden with millions of pounds' worth of goods belonging to the Levant and other trading companies. During the period that the king controlled the cloth-making districts and Parliament held London, the marketing area, the cloth trade suffered badly. Extensive sales of Crown and church lands by the revolutionary government and the enforced sale of their lands to pay their fines by gentlemen who had fought for the king occasioned a great deal of readjustment in the agricultural districts. The heavy taxes levied by the revolutionary governments for the maintenance of the army and navy and for the conduct of senseless wars with Holland and Spain dipped deep into the nation's resources.

Agriculture During the Seventeenth Century

At the time of the accession of James I in 1603, most of the people of England were engaged in agriculture and lived in the country, in small villages and hamlets, usually numbering not more than three hundred persons, spaced at intervals of some three or four miles from each other. The settlements were most numerous in the area lying south of Yorkshire and east of a line drawn from Berwick to Dorset. At the same time in the eastern and southern counties there were districts still almost uninhabited. The population was so sparse as yet that frontier conditions still prevailed.

The villages were more or less self-sufficient, relying on the semi-annual fair or the traveling chapman or peddler for the things they did not produce themselves. Roads were still mud tracks, and most men were born and died in the same place.

In some areas especially well situated to take advantage of markets for grain, meat, or wool, enclosure of the common fields had proceeded during the later fifteenth and during the sixteenth century. This development continued during the Stuart period, particularly under the lead of the greater landowners who saw larger profits in adopting improved farming or in raising sheep. Smaller farmers could scarcely participate in the process, since they did not have the requisite capital to make the change. They had to keep on growing grain to feed their families, and they did not have the land to increase the number of their cattle. The whole business of enclosure must not be overstressed, since in the two centuries ending in 1650 only about half a million acres were enclosed. By way of contrast, the drainage of the Great Level in the Fen country brought about the reclamation of nearly three-quarters of a million acres during the next hundred years. The extension of the business of farming for profit was assisted by the continuation of the rise in prices already noticed during the Tudor period. Many progressive features seem to have been introduced in individual cases by the new type of capitalist gentleman farmer, who appeared in Elizabeth's reign or early in the seventeenth century as the lessee of the demesne to replace the peasant lessee of earlier days. Farmers of this type wanted to make a living, and they desired that that living should be as substantial as possible. They wanted not mere subsistence, but as large a financial return for their expenditure of capital, managerial skill, and manual work as they could get. They devoted great attention to new enterprises, techniques, and crops which gave hopes of enrichment.

The Areas of Improved Farming

As has already been shown, England is divided, by climate and topography, into an eastern district, where agriculture is predominantly plow farming, and an area west of the line from the Severn to the Wash, where grazing, stock-raising, and dairy-farming occupy the chief place. Stock is of course kept on the arable farms

as a necessary complement to the plow, if only because stock was the chief source of fertilizer. During the seventeenth century the old adage, "Down horn, down corn," was still perfectly true. Similarly in the grazing country of the West, arable farming was widely practiced as an adjunct to stock-raising.

In the area given over to arable agriculture, many of the villages were farmed according to the three-field system; in some the two-field system prevailed; and in others, other types of arrangements had developed. In the classical descriptions of the three-field system, the farmers planted with winter wheat their various strips in the great field which had been fallow the year before. The strips in the field planted with wheat in the previous season were sown to barley or oats; and the third field was allowed to lie fallow. It is supposed that all farmers having strips in the same great field were under compulsion to plant the same crop, as this was determined by tradition and by the decision of the village community. Whether this rule was absolute in earlier times is open to question; but certainly during the seventeenth century farmers planted various crops on their strips, subject to the restriction that only winter-sown crops should be planted in the great field planted in the fall, and that only spring-sown crops should be planted in the field sown with oats or barley. The two- and three-field systems themselves were being undermined in places by the process of the exchange of strips between the cultivators and the nibbling off of enclosed farms thus made possible from the great fields.

Outside the Midlands, the chief center for the two- and three-field systems, other types of agricultural arrangements, such as the "convertible husbandry," lent themselves more readily to change. In these areas, except for a block of counties comprising Dorset, Wiltshire, Hampshire and Berkshire, the land had been enclosed directly from the forest or was still in a wild state.

In Lincolnshire there was a great uncultivated waste, thirty miles from north to south, given over to sheep and rabbits. In this county as well as in Cambridge, Huntingdon, Bedford, and Norfolk, the marshes of the great fens were used only for summer grazing when the water was low enough. Suffolk and Essex were not free from marshes. Kent, Sussex, Hampshire, Berkshire, Dorset, Wiltshire, Somerset, Devon, Cornwall, and Shropshire, as well as Wales, had great stretches of uninhabited, uncultivated

swamps, moors, and heath, and Staffordshire and Warwickshire had extensive forests. Cheshire had its wastes and forests, and farther north, in Lancashire, Cumberland, and Westmoreland, the country was practically uninhabited.

The extent to which innovations could be made on the farm during the seventeenth century was in part determined by the problem of what was done with the product raised on any given farm. Where the village continued to be a self-sufficient unit, using most of its products for the sustenance of its own inhabitants, there was little incentive to progress. The farmers continued to raise wheat, barley, oats, rye, peas, beans, vetches, buckwheat, flax, and hemp as their ancestors had done, and they relied on their stock and sheep for milk, cheese, meat, leather, wool, and fertilizer. On the other hand, where villages had transport available to London, Bristol, and other towns, the good prices at which their products sold were an incentive to improvement in agricultural technique.

Most bulky farm products had to go by water, either down the navigable streams or coastwise. The district south of the South Downs shipped its grain from Arundel and Chichester to London. The Thames provided a highway for farm products from Kent, the Isle of Thanet, and the Thames Valley as far west as Abingdon and Banbury. The rivers in the Fen country made it possible to carry grain from many parts of East Anglia to Kings Lynn, whence it was shipped to London, to Newcastle, or even the Continent. In the west the Severn tapped the Welsh Marches and the whole west of England as far as Staffordshire and Warwickshire and made their food available for use in Bristol. It is in the areas thus stimulated by a commercial demand for foodstuffs that progress was most in evidence. Such districts were the Midlands, the south coast, Worcestershire, Herefordshire, parts of Staffordshire and Warwickshire, Kent, East Anglia, and perhaps even parts of Yorkshire. In these regions the best arable farming practices of the seventeenth century were found.

New Farming Practices

As these practices are revealed in the books on farming of the time, the mechanical preparation of the soil, whether loose earth or close and fast-binding earth, demanded first attention. For

wheat and rye three plowings were recommended, one in the autumn, one in the spring, and one in the summer; and the seed was sown as soon as the harvest was over. Land used for spring crops likewise was plowed three times. To do this work all sorts of plows were used, depending on local tradition and local requirements, from the heavy primitive plows with two great wheels drawn by twelve oxen to the light foot plow, without wheels, drawn by two horses. Yard manure, the droppings of the sheep, chalk, and marl were the fertilizers most used, but in some places stone chippings, shreds of cloth, and sand were used depending on what materials were available.

The seed was often treated against diseases, as when the wheat seed was steeped in brine and lime against the smut. A good deal of experiment with new types of crop rotation was carried on. In some parts of Oxfordshire trial was made of a four-course rotation, instead of the usual three-course rotation of wheat, or wheat and rye, barley and pulse, and fallow. The four courses were wheat, beans (the "bean-brush" being plowed in), barley in the third year, and fallow in the fourth. In the districts outside the Midlands, where the convertible husbandry was followed, crop rotations of as many as twelve courses were worked out. In Lancashire, for example, the land was cleared of wood and fern which were then burnt, and the ashes were scattered over the land to enrich it. The land would then be planted in succession with rye, wheat, barley, peas, lupins, vetches or other pulse, and finally with wheat. After a second rotation of these same crops the land would be allowed to return to grass for a period of years. Still more important, artificial grasses and new legumes were being tried to enrich poor soils. "Cold weeping clay" was improved with ray grass. In the Chiltern country sainfoin (wholesome hay, a leguminous plant) was grown as fodder for sheep and cattle. The advantages of clover were recognized early in the century by Norden, but while planted in meadows and used for fodder, it does not seem to have been used in that type of crop rotation which was to become, during the eighteenth century, the basis for the "Norfolk system."

Just past the middle of the century, after the Restoration of Charles II, the Royal Society did much to aid the progress of agriculture by fostering the spread of scientific knowledge. One of its committees was particularly concerned with collecting in-

formation about the present state of English farming, and as a result of an investigation conducted by it in 1665 it is possible to give certain details concerning the agricultural situation at that time. In the papers of the committee a great deal of attention was paid to plows and to the amount of plowing used in different types of soils for different crops, even though as yet there does not seem to have been any great improvement in the plows. There was a great deal of interest in manure and fertilizer. Besides barnyard manure, dressings of marl and lime are frequently mentioned in the reports made to the committee. Wheat, oats, and barley were grown in all the counties for which reports were made to the committee; beans in all save Dorset and peas in all save a district in Yorkshire. Rye was not mentioned in the reports from Kent or Dorset, but was grown everywhere else. Vetches were grown in five southern counties; flax in Devon, Cornwall, and Yorkshire. Various kinds of grasses are referred to, including clover, to which considerable attention was paid in some of the reports. No mention is made, however, of roots, such as turnips.

Numerous varieties of wheat, oats, and peas were recognized, such as the common black, blue, naked, bearded, and wild in the case of oats, and the large white, small white, gray, blue, green, partridge, and black in the case of peas. Many farmers understood the value of seed grown on different soil, and efforts were made to secure seed corn of highest quality. The amount of seed planted varied from county to county, ranging, in the case of wheat, from $3\frac{1}{2}$ pecks per acre in the Marl district of Cornwall to four bushels per acre in Kent. In this county one informant declared that after the land had been bare fallowed and dressed with chalk "we seldom miss a very great cropp 4 or 5 quarters of wheat (32 or 40 bushels) of an acre." In Cornwall and Devon good crops ranged from 12 to 25 bushels of wheat per acre; bad crops from 5 to 10 bushels per acre, with rye, barley, oats, peas and beans in proportion.

By the time that the Royal Society compiled the reports upon which the above statements are based, all sorts of experiments in courses of crop rotation were being tried. There is surprisingly little mention of the three-field rotation in the reports. It was frequently altered by the introduction of a third crop. In Cornwall and Devon it seems that continuous cropping for six years

was usual; and one informant spoke of land which "new dresst every yeare" had been continuously cropped without intermission of tillage for 36 years. Examples of convertible tillage occupy an especially prominent place in the reports. In this form of farming, grazing land is plowed up, treated and planted in various ways, and then allowed to go back to grass. In the Asford district in Kent, for example, "cold weeping ground" was first grazed as close as possible, then plowed once, sown with oats or small beans, and harrowed. In the following years the course was fallow, wheat, oats or small beans, fallow, and finally wheat; "after which crop t'will not be fitt to bee continued in Tillage, but we lay it down for Pasture or Meadow for ten or twelve years, then we convert it to Tillage." Such land, properly fertilized while in tillage, became a better pasture or meadow than it had been before.

The Problem of Fodder

In the country of arable farming cattle and sheep were necessary adjuncts to successful operations. It will be remembered that from very ancient times cattle were pastured on the common wastes of the villages; and, after the crops had been harvested, they were turned into the common plowed fields to feed upon the stubble and the aftermath. In some counties, where it was possible to lay together demesne strips in larger fields, these were enclosed and frequently devoted to pasturing cattle and sheep. In other districts more careful regulations were made to fix the number of head of cattle that the lord of the manor and the villagers were permitted to put to graze on the waste and on the stubble, in an effort to prevent overcrowding and consequent deterioration. The basic problem in the growing of cattle was the provision of sufficient food. In the absence of roots and concentrates, such as turnips and cottonseed cake upon which the modern grazier depends, the supply of hay, grass, and straw determined the number of cattle which could be carried over the winter. Meanwhile, until the question of pasture conservation was solved, breeding remained a secondary matter. Beasts weighed on the average 600 pounds. Milk yields were correspondingly low. A gallon at a milking was not to be despised; a gallon and a half was good, and two gallons were much to be desired.

The procedures worked out for the most effective use of pasture varied little from place to place. Yet it was in the counties devoted particularly to grazing that most attention was paid to the problem of fodder. Here, of course, arable farming was practiced in conjunction with stock-raising, just as stock were joined with plow farming in the areas where tillage predominated. Enough grain had to be raised to feed the local population even in a stock-raising district; and it was discovered, moreover, that the land did its best when it was not "grazed eternally." The result was the extensive use of convertible husbandry. The land was plowed up according to courses of rotation varying from seven to ten years, and then laid down in grass again for a certain period. These rotations differed from district to district and from soil to soil, but their ultimate purpose was to increase the yield of food and of fodder. The flooding of meadows with water from rivers, to make water meadows, was another method of increasing the amount of fodder available. "These," said the surveyor Norden, "require little or no help at the owner's hand, only the syde of these rivers overflowing, do feed them fat, gives great burden, and very sweet." The use of clover and sainfoin, already referred to, was still another way in which the amount of fodder could be increased.

The agricultural progress of the second half of the seventeenth century is perhaps best revealed by a study of the books on farming which made their appearance in this period. These make it clear that by the end of the century marl was extensively used as a fertilizer. Clover was grown in Worcester and Hereford, Essex, Sussex, Surrey, Berkshire, Hampshire, Leicester, and Gloucester, as well as in the eastern counties. This does not mean that clover was generally planted as yet, but rather that experiments with clover, in conjunction with ray-grass and other crops, were widespread.

Turnips

The great new crop of the future was the turnip root, planted not as a vegetable in the cottage garden, but as a field crop. The field cultivation of turnips was suggested as early as 1577. In 1659, in his *Adam out of Eden*, Adolphus Speed eulogized turnips, noting that they made excellent fodder to fatten cattle, to in-

crease the milk supply of cows and the egg production of chickens, to fatten pigs, and to feed rabbits. The same root, with small additions, would make good cider. The tops could be mixed with rape or linseed cakes to make "pottage" for cows. Speed, who was obviously an enthusiast, himself planted his turnips six inches apart and, sowing ten quarts of seed to the acre, took two good crops a year on poor ground. The turnip, grown as a field crop, was to solve the problem of cattle fodder and at the same time to aid in dispensing with fallowing part of the land each year. In 1645 Sir Richard Weston advised the use of turnips for the reclamation of barren and heathy land. In 1670 Gabriel Reeve reprinted that advice, which was constantly reiterated in the later textbooks on farming. Grown at Godalming in Surrey as early as 1650, turnips had become established as a field crop in East Anglia and elsewhere by the turn of the century or earlier. Turnip cultivation is mentioned in Suffolk in J. Mortimer's *Whole Art of Husbandry* of 1707; John Houghton describes the value of turnips in Norfolk and Essex in 1681-1683; they were grown in Leicestershire, Hampshire, and Norfolk at about the same time. Yet it must be observed that turnip cultivation did not yet become general.

Capital and Labor in Agriculture

Two other factors must be considered in connection with the progress of agriculture in the seventeenth century. Of these the first was the question of an adequate, cheap labor supply. The second was that of the use of capital in large amounts to make possible new experiments and to introduce new techniques.

An adequate, cheap labor supply had been the dream of the feudal knight when he reduced the peasantry to serfdom during the twelfth century. It had been the goal of the later Plantagenets and the Tudors in all their labor legislation, which culminated in the Statute of Apprentices and the Poor Law of 1601. Yet the farm laborers seems to have had a way of escaping from the trammels of maximum wages, compulsory hirings, and whippings at the cart's tail for refusal to work by the simple device of running away. The Stuarts continued the noble experiment of making men work cheaply, and eventually, after the Restoration of Charles II, evolved the Act of Settlement (1662). This law tried

to get at the matter by attacking the laborer's right to move about freely from place to place. No laboring man was to be permitted to gain a right to live in any place but the village where he was born. The local authorities were given an incentive to enforce the law by the threat that if they allowed a stranger to live in their village for more than forty days they would be responsible for maintaining him on the poor rates, which were proceeds of local taxes, in case he became ill or destitute. It is not altogether certain how effectively the Act of Settlement functioned in fulfilling its purpose; but certain writers are of the opinion that by placing the agricultural workers very completely at the mercy of their employers, the farmers and landlords, it did provide that adequate supply of cheap labor which had so long been sought.

The problem of the source of the capital necessary to introduce improved types of farming practice is somewhat complicated. In all probability most of the improvements which were made on the ordinary farm were the result of the purchase out of the savings of the farmer or landlord of new seeds, stock, or equipment which was then developed or applied by the cheap labor of the time. Everywhere there were men who resented the slowness of this process. Their importance expressed itself, during the later period of the seventeenth century, in projects for land banks, which should lend money on very easy terms for the improvement of farming. One such scheme, worked out by Dr. Chamberlayne in 1693, was based on the thesis that land was actually worth eighty times its annual rent and that this inflated value could be used for the issue of paper notes to provide funds for its improvement. In 1693 Nicolas Barbon and others actually projected a National Land Bank founded on a somewhat sounder but similar idea and received parliamentary authorization to incorporate the bank in return for a loan to the Crown of £2,564,000 at 7 per cent. The subscriptions to the new corporation netted only £7,100, of which £5,000 was underwritten by the king himself.

Yet in spite of the failure of the landed interest to tap the credit resources of the nation through the establishment of banks catering to the needs of the farming and landowning classes, a certain amount of capital was drawn from the commercial and mercantile centers through investment in land on the part of

merchants and entrepreneurs. Social position was still closely related to land ownership; and as the merchants of London and other towns, grown rich in business, sought to found families, they purchased estates in the country. Almost invariably the new purchaser, keen for the greatest possible profit as well as prestige from his estate, introduced new methods, made improvements, and paid for them with the capital he had accumulated in business. This sort of thing had been going on for several centuries. The process was already well established in the time of Elizabeth, but it seems to have been accelerated in the last decades of the seventeenth century as the expansion of commerce made many town businessmen rich.

National Policy in Aid of Agriculture

Finally some attention must be paid to the current interpretations of national policy in aid of agriculture, which may have had some importance in providing incentives to changes in certain directions. Farm relief was nothing new. At various times during the fifteenth century laws were passed permitting the free export of grain and prohibiting its importation from abroad in order to give the farmer a better price. Under Mary the policy of aiding the farmer comprised legislation permitting the export of grain when the price was under certain figures and in Elizabeth's reign, after 1572, the export of grain was made subject only to such restrictions by the council as might be necessary to avoid scarcity and excessive prices. After the Restoration the landed interests asked for more than mere freedom to export grain freely. In acts for the improvement of tillage and the breed of cattle of 1660 and 1670 they were given prohibitive tariffs against imports to secure them against competition in the home market. Efforts were now made to secure the repeal of a duty on export, originally levied as a revenue measure. Presently the embattled farmers and their allies, the landlords, sought and won a bounty on the export of grain when the price ranged below 48s. per quarter (\$1.50 per bushel). This policy of aiding farming by drafts upon the public treasury, first introduced in statutes of 1672 and 1689, was continued far into the eighteenth century. It was justified by those who benefited from it on the ground that it raised prices, tempted capital to invest in land, encouraged the

production of a plentiful supply of foodstuffs so that the populace need not fear a shortage, encouraged shipping, and enabled the landed interest to bear an unusually large share of the nation's taxes.

Agricultural statistics of the sort published today by the ministry of agriculture were of course not compiled during the seventeenth century. Occasionally it is possible to find a few figures which indicate quantitatively the relative advance made by English farmers of the Stuart, as compared with the Tudor period. Grain yields are of some value in this connection. Recent studies indicate a rise in the yield of wheat per acre from around eleven bushels in 1600 to 16 bushels in 1700. Contemporary writers give all sorts of estimates, some of them so high that we may well believe that they had no real conception of figures or that they were indulging in double talk. Thus in 1601 Sir Hugh Platt declared that thirty-two bushels of wheat to the acre contented the ordinary farmer and that if a farmer obtained eighty or ninety-six bushels per acre, then "hee acknowledgeth himselfe to have receyved an extraordinary favour and blessing from the Heavens."

A few comparative figures of the rental value of land are available. These apply to certain manors in Northamptonshire. In the year 1332, 120 acres of land on the manor of Grafton in this county were worth 5d. an acre per annum; ten acres of meadow were worth 2s. per acre per annum; and a separate pasture, called the Wold, was worth 1s. 6d. a year. In the year 1558, in the reign of Mary, arable was valued at 8d. per acre per year and pasture at 2s. per acre per year. In surveys made in the middle of the seventeenth century covering Grafton and other manors, arable land was valued at an average of 4s. 6d. per acre per annum, with the highest value 12s. per acre and the lowest 2s. 8d. per acre. Pasture land was valued on the average at 14s. 6d. per acre a year, with the highest value £4, and the lowest 4s. 11d. Meadow averaged 17s. 11d. a year per acre, with the highest value £2 11s. 5d., and the lowest 10s. At Grafton, taken alone, the average annual value per acre of arable was 4s. 2d.; of meadow, 15s. 6d.; and of pasture, 19s.

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INDUSTRIAL PROGRESS DURING THE SEVENTEENTH CENTURY

DURING the second half of the Tudor period, beginning perhaps as early as 1540 or 1550, new industries scarcely in evidence in England earlier had been introduced in considerable numbers, new technical processes were adopted from the continent for use in old established industries, and entirely new inventions and new processes were applied. All three of these factors involved investments on a far greater scale than could be ventured by single individuals. The plants had to be larger and fitted with costly equipment to take advantage of the new methods, many workmen had to be employed, and, owing to the time required for manufacture, there was often a long period between the purchase of supplies and the sale of the finished goods during which large sums were tied up in materials.

A few examples of the new kinds of capitalistic ventures as they were found in the earlier years of the seventeenth century may be given. First there were the entirely new industries and the industries entirely transformed by new techniques. During the reign of James I, the Crown interested itself in exploiting the manufacture of alum in Yorkshire. Each alum "house" had large brick furnaces and cisterns, piles of alum stone, coal and wood for fuel, and about ten metal pans for boiling the alum liquor. About 60 workmen were employed in each house, beside carpenters, coopers, and smiths who were more casually engaged. Eighteen carters were needed for each house to transport the alum stone, coal, and wood to the plant and to take away the finished alum. Each house is said to have cost many thousands of pounds, and the annual expense for materials was over £1,000. Again, in 1613 John Browne employed 200 men in his cannon

f foundry in Kent. Sugar-refining works, brass factories, and saltpeter plants required less expensive outlays than did alum houses and cannon foundries, but even here there was a large outlay for buildings, furnaces, presses, pans, and materials.

The part played by these large factories must not be overstressed. Something like 10 paper mills are known in England in the 1630's. These did not supply the domestic demand, which continued to be met by imports from France. Most of the sugar used in England was imported already refined. There were perhaps twenty alum houses in the reign of Charles I and only four cannon foundries in Sussex in 1613. Perhaps all in all there were less than fifty really large-scale establishments, with water-driven machinery, great furnaces, and the necessary accessories in England at the beginning of the Civil Wars in 1642.

Great amounts of capital seem to have been required, and many workmen were employed as a result of extensive changes in old established industries. The rapidly growing demand for coal and ore made it necessary to adopt safer and less primitive methods in mining operations. The output of coal increased perhaps eightfold from 1540 to 1640, and that of iron ore and lead ore doubled at least. Shafts were sunk to a depth of thirty, forty, and even fifty fathoms. At these levels the presence of water and gas presented grave dangers both to the workers and the mines, and it became necessary to dig expensive adits and ventilation shafts and to provide pumps for drainage. The horse-worked pumps at one mine cost £2,000 a year to operate, and the digging and lining of a ventilating shaft cost thousands of pounds. Whereas a coal mine in the middle of the sixteenth century seldom produced more than a few hundred tons of coal a year, with the work done by little partnerships of miners, in the seventeenth century there were collieries which raised from 10,000 to 25,000 tons of coal a year and employed hundreds of workers.

All through the seventeenth century and even later iron smelting and the forging of the smelted iron into finished wares was still carried on to a certain extent by small manufacturers working with small quantities of ore and metal. But beside the small bloomery forge, handling 20 tons of iron a year, there arose large capitalistically managed blast furnaces, handling as much as five hundred tons of iron a year. These "high" furnaces appeared during the sixteenth century and became common before the

beginning of the Civil Wars, particularly in Sussex, Glamorgan-shire, Monmouthshire, the Midlands, the Forest of Dean, and Scotland. The furnace itself, its great bellows twenty feet long, the overshot water wheel used to drive the bellows, the dam to impound the water, and the necessary store houses, stables, and workmen's dwellings all involved the expenditure of £1,000 or more per furnace. In the fining forges, where great hammers beat the smelted iron into wrought or malleable iron, the water wheels, hammers, and other machinery involved almost equally large expenditures.

The preparation from the raw metal of steel and of ingots, sheets, rods, and wire for the use of smiths and of the manufacturers of nails and other finished goods came to be organized as large-scale capitalistic industries. In the reign of James I cutting mills were set up in or near London to produce iron bars.

The rising costs of timber used as fuel began to check the expansion of iron smelting before the opening of the Civil Wars, and it even began to interfere with the production of lead, copper, and tin. The use of coal in some of the preparatory processes of smelting somewhat offset the shortage of timber which continued to be used in the smelting furnaces themselves. In other lines of industrial production the rising costs of wood for fuel led to a good deal of experimentation during the seventeenth century with methods of replacing wood by coal. English inventors sought to work out new types of heating apparatus which would reduce the consumption of wood or which would make possible the use of coal.

The difficulty was that coal frequently caused damage to certain raw materials when its sulphurous fumes came into contact with them; and the problem was either to devise furnaces which would prevent any contact between the materials and the fumes or to purify the coal itself. The second solution came with the use of coke, originally used in drying malt. The first involved the development of elaborate ovens and kilns fired by coal in which high temperatures could be obtained away from the actual flames. One form of such apparatus provided for a kiln heated by means of several small furnaces adjacent to it. Another involved the use of closed clay crucibles heated directly over the coal.

The kiln, heated by furnaces, was especially important in the firing of bricks, which, now in the early seventeenth century, first

came into common use in building, paving, and the construction of flues and cisterns. There is probably a direct relationship between the cheapening of production costs made possible by the use of coal and the more extensive use of brick which, before the reign of James I, had been burned by means of wood fires. The closed crucible was used particularly in glass-making and in the manufacture of steel by the cementation process.

The use of the new furnaces and kilns perhaps more than other inventions furthered the progress of capitalist industry. The new techniques which frequently accompanied the use of the new coal-burning furnaces sometimes completely altered the status of the workers. In glass-making, for example, large-scale capitalist factory methods had been in vogue ever since the introduction of the industry into England during the middle of the sixteenth century. But the very high degree of skill which was required of workmen placed them in a very favorable position. In the seventeenth-century glass-houses, where production was on a much broader scale than in the sixteenth century, the output was chiefly that of the cheapest commercial window glass and glass bottles. Little was required of the workers beside brawn, and they were reduced to the position of stokers and laborers.

Coal was used in industries where its adoption did not involve any great technological changes, but even here there were important developments. Owing to the fact that the cost of transporting coal was high, the use of coal resulted in the concentration of certain industries near the coal fields. Here large units would be the rule, to take advantage of all economies of the new fuel, while the smaller scattered establishments of former days would go to the wall because of their inability to compete with the newer plants. In earlier centuries the manufacture of salt from sea water had been carried on at various places along the seashore. With the growing demand for salt during the sixteenth century, coal began to be used for evaporating the water; and between 1580 and 1630 the industry was concentrated at the mouth of the Tyne and of the Wear and along the coasts of the Firth of Forth, where very cheap coal was available in abundance. Great iron pans 20 feet square and 5 or 6 feet deep, heated by coal furnaces, took the place of the tiny lead pans of earlier days. Four men were needed to tend a single pan. So great was the concen-

tration of pans under single control that as early as 1589 one manufacturer claimed that he employed 300 men and that he had £4,000 invested in his works. At the time of the opening of the Civil Wars, the works at South Shields employed 1000 men.

Soap-boiling works, lime-burning kilns, and breweries show a similar increase in scale during the early seventeenth century, partly because of the increase in demand and partly because of the introduction of the use of coal. In the reign of James I one London brewery represented a capital investment of £10,000. Dyers of cloth in London seem also to have adopted larger-scale operations, since certain London dyers were buying coal in as large quantities as the chief soap-boilers and brewers.

Seventeenth-Century Capitalism

By the beginning of the seventeenth century enterprising men had some notion of the magic results of capitalist methods in production. Through the use of accumulated capital for the provision of materials, tools, and equipment on a large scale in conjunction with cheap labor and advanced technical skill, profits undreamed of in the past were made possible. The great problem of the seventeenth-century entrepreneur was three-fold. He had to discover how to get hold of capital on such terms as would be most advantageous; he had to find the kinds of goods and services that lent themselves to capitalistic methods of production and that, at the same time, were assured of a sale; and he had to work out the methods and processes of making goods of this character.

The annual savings of the English people were great enough to provide all that was needed in the way of capital. In fact, toward the end of the seventeenth century there was such an abundance of capital available for investment that all sorts of fantastic schemes, such as those for the recovery of treasure from wrecks, were advanced. While many undertakings were developed by individuals and small groups of partners, the most striking were those organized on the joint stock principle. The sale of shares of stock in commercial and industrial enterprises proved to be an easy way to tap capital; and the facilities for subscription to new shares and for the sale of current securities developed rapidly during the century. Working capital, especially for commercial ven-

tures, was advanced by the bankers, who increased in number rapidly after the Restoration; and the opening of the Bank of England in 1694 proved especially important for the mercantile world.

Invention and Experiment

It must be kept in mind that the seventeenth century witnessed remarkable progress in the theoretical aspects of the sciences of physics, astronomy, mathematics, and in other fields. Galileo, for example, who lived from 1564 to 1642, did much to lay the foundations of modern experimental science in his work on the pendulum, projectiles, hydrostatics, and the motions of the heavenly bodies. Blaise Pascal (1623-1662) founded the theory of probabilities, discovered the properties of the cycloid, and contributed to the advance of differential calculus. His experiments with the pressure of the atmosphere led to the invention of the barometer, and his study of pressures on liquids in confined spaces was epitomized in his enunciation of Pascal's Law. Robert Boyle (1627-1691), to name another of the long series of eminent men of science of the period, was the first to distinguish between a chemical element and a compound, and he defined clearly the nature of chemical reaction. He is perhaps even more famous for his formulation of Boyle's Law, explaining the relation between pressures and the volumes of gases.

In England there was widespread interest in the purely theoretical aspects of the work of these and other savants, and much was done to spread the knowledge of the achievements in the scientific world by the foundation, after the Restoration, of the Royal Society. Its published *Proceedings* contain the original descriptions of many notable advances.

More than other peoples, except the Dutch, the English seem to have been eager to apply the new theoretical knowledge evolved in the study and laboratory to practical ends. Mention has already been made of the efforts of the Royal Society to improve agricultural methods and practices. An even better illustration of the union of theory and everyday life is to be found in the *Century of Inventions* of the Marquis of Worcester. This is a book written by Edward Somerset, second Marquis of Worcester, while he was in prison during the Commonwealth, in which he lists, and in some cases describes more or less clearly,

one hundred inventions which he had "practiced." Of these inventions, twenty-three refer to secret writing, ciphers, correspondence, and signals; thirty-two to military and naval affairs; six to automata, such as mechanical birds; two to means to enable a player to cheat at cards and dice without arousing suspicion; two to arithmetic and perspective; three to seals and watches; nine to mechanical appliances, such as little engines to stop a coach (by releasing the horses from the coach in case they ran away); ten to domestic affairs; and thirteen to hydraulics and a "water-commanding engine." Invention number nine noted an "engine portable in one's pocket which may be fastened on the inside of the greatest ship and at any appointed minute it shall irrecoverably sink that ship." Invention number ten refers possibly to a submarine; number eleven is a note of how to prevent and safeguard any ship "from any such attempt"; number twelve mentions an unsinkable ship. Cannon-proof portable fortifications on land and sea, pleasure-gardens floating on the Thames, artificial fountains, balance waterworks, bucket fountains, water-clocks, hoists, pontoon bridges, universal alphabets and secret writing by means of threads, bracelets, sieves, smells and other things, key pistols, clocks which at a certain hour lighted a fire or a candle, a wheel for perpetual motion, "often-discharging" pistols and musquets, a way of making a man fly, "self-winding" watches, combs, knives, forks, and spoons for the secret conveyance of letters, an adding machine, a candle mold to make five hundred dozens of candles a day, with a special ingredient to make the tallow cheaper, brazen talking heads, artificial horses, a jack to force a door, another to lift a ship out of the water, fire waterworks, and "semi-omnipotent" engines all attracted his interest. The greatest of the Marquis' inventions, the water-commanding engine, will be discussed more fully later. A man named Calthoff or Kaltoff, a highly skilled mechanic who worked for the Marquis for many years, made little models of some of these inventions (not all of which were original with the Marquis), and he carried out the Marquis' ideas in full-size machines which were set up at his residences at Raglan and Vauxhall.

The list given above is interesting less because of the intrinsic merit of many of the items than because of the curiously insignificant character of the Marquis' efforts. Inventors spent their time on such useless things as combs in which to carry letters

secretly partly because men in the past had done so, partly because they could not see enough of the trend of English civilization to know what would be significant. The demand for new machines, such as the steam engine, for example, was so slight that it was scarcely recognized. To the Marquis and other inventors secret writing, ciphers, portable forts, "often-discharging" pistols, and "self-winding" watches seemed of as much immediate importance as devices to create motion or provide power.

Except for the energy used in the form of heat in the furnace industries and the power used in working pumps in mines and city waterworks, the amount of mechanical power used in industry during the seventeenth century continued to be small. The increase in size and scope of most industries was so slight that windmills and water wheels were able to supply what power was needed beyond the energy derived from the brawn of the workers themselves. Perhaps there would have been a more rapid extension of the use of windmills and water wheels but for the difficulties growing out of the high cost of such installations, the physical limits of location, and the inefficiencies of the application of their power to machines. So important was the cost factor that men continued to work their machines with their own muscles unless especially large amounts of power were called for.

The most significant demand for power beyond the capabilities of men and animals came from the requirements of pumping water in mines and city water works, even though many of the latter, in England at least, relied on gravity until toward the close of the seventeenth century. The pump itself, incidentally, inadequately understood at the opening of the seventeenth century, was greatly improved through the experiments of Galileo and of Otto von Guericke, burgermeister of Magdeburg, who formulated the principles on which the vacuum pump works, and through the designs of Samuel Moreland, who patented a plunger pump in 1675. Pumps were operated by all sorts of power, wind, water, man, and horse; and all were soon found to be either too costly or too inadequate for the job in hand. It was this problem of pumping which required a motor of greater efficiency and lower cost per unit of power than anything yet known.

Steam had interested sixteenth-century scientists, but it was not until 1615 that Salomon de Caus was able to distinguish between steam and air and to draw the practical conclusion that there were

potentialities to be found in steam of a different order of magnitude from those existing in air under pressure. The continuation of experiment from the point at which de Caus left off was the work of the Marquis of Worcester. A pumping engine was installed at his castle of Raglan about 1630, and other work was carried on at Vauxhall prior to its confiscation by Parliament in 1643.

The Marquis himself spent some years in the Tower as a prisoner of the Protectorate, and it was during this period that he wrote his *Century of Inventions*. After his release he sought to recoup his fortunes by the development of his "water-commanding engine." The machine used the direct pressure of steam to raise water from reservoirs which were a part of the engine and relied on a vacuum in the reservoirs to draw the water from its source through a pipe into the reservoirs. In 1663 Parliament granted the Marquis a monopoly of the use of the "water-commanding engine" for 99 years. It was his hope to develop a water company using the engine to supply a large part of London with water, and so great was his expectation of profits that he withdrew a claim of £40,000 against the Crown in return for the cancellation in his patent of a clause assigning 10 per cent of his profits to the king.

Worcester's engine seems never to have had any practical success, but its principles were the basis for the work of Captain Thomas Savary, whose engine was first noticed publicly in 1698. Savary's "Miners' Friend" belongs more properly to the eighteenth than to the seventeenth century and will be considered in detail later.

Worcester's failure to build a practical working engine was due to his inability to master certain details of construction; and here the difficulty was probably connected with the lag between the development of machine building and metal finishing on the one hand and the advanced technical requirements for making the new engines on the other. In the manufacture of clocks, watches, instruments, builders' hardware, and various items of marine equipment there had been a great deal of progress; but since the material of which most tools and machines were made was wood, there had been no call to develop metal-working machinery fitted to handle very heavy parts.

What advances there were, were made in connection with the development of various types of lathes and lathe attachments. Jacques Besson, who died in 1568, designed a screw-cutting lathe

and a second device for turning oval and irregular shapes. Drawings of the year 1690 and 1701 indicate that during the course of the seventeenth century this type of lathe had become thoroughly familiar. A third departure was the introduction of the mandrel or live head, holding a chuck into which articles could be fitted which were incapable of being held between centers. Much remained to be done before even the lathe attained any degree of efficiency in handling iron. The boring machine, the introduction of which marked the next significant step in metal working, was not even thought of.

New Industries, Services, and Goods

Perhaps the most serious difficulties which stood in the way of the progress of capitalistic industry were wrapped up in the difficulty of discovering the kinds of goods to make and the services to offer. Such things had to be useful in terms of the standards of living current at the time or of such a sort as could be introduced readily into everyday living without too much of a departure from existing fashions and practices.

Public Utilities

Even during the preceding century the provision of town water supplies met the conditions just specified; and during the seventeenth century the location of reservoirs, the building of pumping stations, the laying of conduits or pipes of hollowed elm wood, and the installation of hydrants formed some of the most widespread and profitable forms of industrial enterprise.

During the Middle Ages London had been supplied with water from brooks and wells near by, from which pipes led the water to fountains located in different parts of the city. In the year 1582 Peter Morice secured a grant empowering him to build a force pump under the first and second arches of London Bridge, worked by great water wheels which used the flow of the Thames through the arches as motive power to pump Thames water through conduits to supply the city. Since the invention was not considered "sensible," Morice could get no capital to put into the project from any great man or magistrate and consequently had to build his plant at his own cost. The enterprise proved successful and

profitable, and the Morice family continued to provide water to the southern part of the city until 1703, when they sold out to another company.

The amount of water which could be pumped from the Thames was for a long time limited by the efficiency of the existing pumps and by the amount of power created by the flow of the river through the arches of London Bridge. Even before Morice built his pumping station, other projects had been advanced to bring water through pipes by gravity from the hills to the north of the city. In 1609 Hugh Middleton agreed to take over certain rights already acquired by the corporation of the city of London and to build a channel to bring a fresh stream of running water from the springs of Chadwell and Amwell in Hertfordshire to London.

At one time Middleton had 1700 men engaged in the work, and the costs far exceeded his expectations. In 1612, perhaps to secure the protection of the Crown against those who sought to impede the enterprise, Middleton entered into an agreement with James I, by which James obligated himself to pay one-half of all the amount already expended and one-half of the funds required to complete the project. Middleton divided the half interest which remained to him into 36 shares, and these 36 shares, representing an investment of £9,262 *qs.* 6*d.*, constituted the New River Water Company. The other half interest, representing the advance of £9,262 *qs.* 6*d.* from the Exchequer, belonged to the king. The work went ahead rapidly, and water was led into the reservoir at Islington on September 29, 1613.

In 1631 King Charles I conveyed his half interest to Middleton in return for an annual revenue of £500. The Company was at that time paying about 4 per cent. In 1640 it was paying around 12 per cent annually. In the period after the great fire of 1666 many property owners were ready to have supply pipes brought into their new houses. Profits increased so rapidly that in 1680 the dividends stood at over 50 per cent. Even though the very rapid formation of new water companies during the last decades of the century and the increasing competition between them cut into the profits of the New River Company, its shares were worth £4,000 each in 1698 and 4,500 guineas in 1708.

The chief expense attaching to the services performed by the New River Water Company and by the other companies also was for wooden pipes and their replacement. The elmwood pipes

seldom lasted more than twenty years. Because of the difficulty of securing trees with sufficiently large trunks to carry a heavy stream, several sets of mains had to be laid in the same circuit. Competing companies sometimes laid their mains in the same streets. No good way of making tight joints between the pipes was ever found, and consequently there was always a great deal of leakage, and when a leak got too bad, as much as 200 yards of roadway had to be torn up to find it. The New River Water Company had to replace about 20 miles of conduit every year.

Water companies were organized during the seventeenth century in various towns outside London. In 1634 Philip Mainwaring and others formed a water company at Chester. In Newcastle, where the sinking of coal shafts impaired the medieval water supply, four organizations undertook to supply the town with water during the seventeenth century. Two of the companies used pumping machinery. One of the pumps, which was set up between 1697 and 1699, was said to be capable of raising 120 tons of water 300 feet in an hour. In Derby and Liverpool also new water companies were formed in 1693 and 1695. The Liverpool companies were failures, and throughout the eighteenth century Liverpool was said to be "scantily supplied" with water by the agency of water carriers.

The only other forms of public utility enterprises which received attention from entrepreneurs during the seventeenth century were the postal service and the street lighting of cities. During the middle of the seventeenth century public postal service was instituted, and various companies and individuals undertook to manage the system and perform the necessary work. One of the most interesting developments was the introduction in 1680 of a service known as the *Undertaking of the Penny Post*, to carry letters from one part of London to another at the rate of one penny (two cents) each.

During the earlier part of the seventeenth century what street lighting there was, was provided by lanterns hung out by citizens before their houses. An order of the Common Council of London in 1599 provided that this should be done by Londoners between October 1 and March 1. The streets remained dark in spite of a few "good substantial lanthorns and candles," and after the Restoration interest began to be taken in better street lighting with a view to reducing crime. In 1682 a company which called itself

The Proprietors for the Lights advertised that they were prepared to provide street lighting. Two years later Edward Windus received a patent for an improved street lamp, which used convex reflectors to increase its efficiency. A company known as the *Convex Lights Company* was formed to install the new lamps, light them, and extinguish them at a small annual charge to be paid by the householders before whose houses the lights were placed. A few years later a rival company entered the field with a different type of lamp known as the *Light Royal*. The *Light Royal Company* installed its lights at a cost of 5 shillings and charged the same sum annually for maintenance on the 120 moonless nights of the year. In 1692 the *Glass Globe Lights Company* appeared in London, using lamps which were set on poles 10 feet high so that there should be "no dark shadows whatsoever but that the light shall be always clear and equally dispersed . . . delightful and useful to passengers, without glaring or dazzling the eye." This company used rape seed oil as an illuminant and charged six shillings a year per lamp for its services.

The Extractive Industries

When the actual bulk of the product is considered, the extractive industries brought about by far the most significant changes in ways of living that were realized during the seventeenth century. Something has already been said to indicate the rapidly extending use of coal for industrial purposes, and as fast as the market absorbed the existing supplies, new mines were opened to provide coal in ever greater volumes. In the smelting of iron ore production was retarded by the cost and scarcity of the wood used as fuel. All through the century experiments were made with a view to substituting coal in some form for wood. Patents were issued to inventors claiming to have found a method of using coal in smelting iron as early as 1589 and 1607, but it is not certain that these early inventors ever tried to put their methods into actual operation. In 1612 Simon Sturtevant started a company, in which the king and members of the royal family were shareholders, to smelt iron with coal as a fuel. His promise of a saving of £320,000 annually by the use of his process intrigued investors, but he did not succeed in using coal in smelting iron. His successor, John Rovenzon, who reorganized the company, was no

more successful. During the 1620's Dud Dudley, son of Lord Dudley, is said to have made iron with coal on a profitable basis, but floods, local prejudice, the disorders of the Civil Wars, and protracted suits in Chancery ruined his fortunes. His secret died with him. In 1677 Frederick de Blewstone established a furnace burning coal at Wednesbury. The result was a "dismal failure."

Although the scarcity of wood in England prevented any rapid increase in the production of smelted iron, Ireland was still plentifully supplied with forests, and during the middle of the seventeenth century a great number of iron works for the smelting of iron were erected there. The iron was shipped from Waterford to London at an inclusive price of £10 or £11 per ton against a market price of £16 to £17 10s. Great profits were made, but more important, iron, the material which was to transform technology, was made available for the English users in a steadily growing volume in spite of the failures of English ironmasters to discover the secret of the use of coal in smelting.

The production of alum and saltpeter attracted considerable interest during this period without any very significant results. The production of salt, on the other hand, the basis for the heavy chemical industries, underwent important developments. During the earlier part of the seventeenth century attention was concentrated on the extension of the evaporation of sea water in great pans, with the use of coal as the fuel. During the second half of the century the number of salt pans fell off rapidly. As the result of the free admission of Scottish salt during the Protectorate, so it was said, 80 salt pans were abandoned, and after the Restoration 160 more passed out of use. Actually, what was happening was that the discovery and working of the saline springs in the county of Chester made it possible to produce salt at a price lower than that at which the salt pans on the northeast coast could be operated. As a result of these new sources of supply and new processes of production, cheap salt was made available in sufficient quantity to be used as the basic material in entirely new industries.

Consumers' Goods

Coal, salt, bricks, iron and other metals such as lead, copper, and tin, of which the production was increased greatly during the

seventeenth century, enter only to a limited extent into immediate consumption by the ultimate user. They are sometimes called capital goods, because the greater part of their output is used in the processes of making other goods which are in daily use by ordinary people. Such goods are known as consumers' goods. What novelties did seventeenth-century technology provide in this field? In a general way, there were fewer novelties in consumers' goods than there were developments in their manufacture. The trend was rather to a larger output of articles already in use than toward the introduction of new commodities. There were, moreover, refinements in styling and finish. Compare, for example, the heaviness of a Jacobean chair, chest, or bedstead with the grace and comparative lightness of the furniture made in the reign of Queen Anne. Perhaps it would be correct to say that, in the matter of staple goods which continued to be made as they had been in the past, ordinary people used more than they formerly had. The rich and well-to-do adopted higher and more luxurious standards. Not only did they avail themselves of more elegant furniture and handsome houses in which to display it, but they wore linen, silk, and velvet in place of the more sober and durable woollens of earlier days. We know that by the end of the century the manufacture of linens and silks was well established in England; that the use of calicoes and chintzes, imported from India, was so fashionable that domestic efforts to produce tolerably good imitations were soon taken in hand; that wall paper came into popular use; and that the manufacture of fine white writing paper made great strides.

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Chapter 13

COMMERCE AND COLONIZATION DURING THE SEVENTEENTH CENTURY

Colonization: General Considerations

WHEN the seventeenth century opened, England had not yet founded a permanent colony in either America, Africa, or Asia. Some experience in planting settlements had been won in Ireland and a few attempts had been made in America. The real interest of Englishmen in those areas opened to European exploitation during the fifteenth and sixteenth centuries was not colonization, but the discovery of gold and the finding of a passage to India which would be more convenient than the Spanish route through the Straits of Magellan or the Portuguese way around the Cape of Good Hope. Many London businessmen believed that the two projects of gold-seeking and exploration for the passage could be combined. Even while they were sending out their trading ventures in the name of the East India Company to reach India via the Cape, they discussed and planned a search for the passage through the North American continent, coupled with prospecting for gold en route. To realize their ends they organized the Virginia Company to establish a base from which their enterprises might be conducted, and in 1607 this company effected a settlement at Jamestown in the colony of Virginia. Other motives also were important in bringing about the "planting" of Jamestown and other places. There was a keen eagerness to build a barrier against Spain and even to establish bases from which to operate against her commerce and strongholds in the West Indies. A little later the persecutions of the English Separatists and Puri-

tans in England and their unwillingness to live permanently in Holland induced them to migrate to New England. Even in the settlement of New England there were economic factors to be considered; for many of those who came to New England were not Puritans, but fishermen and traders and ordinary folk hard hit by the current depressions in England. The lure of the rich lands to the west soon attracted settlers from the seacoast towns into the valley of the Connecticut. The desire to convert the heathen Indians to Christianity and the need to find homes for England's surplus population were put forward as talking points by many different groups, but these considerations were scarcely more than filling material to bolster up petitions for charters and patents from the Crown.

Jamestown was settled in 1607 by a group of London capitalists organized as the Virginia Company. For years the colony's existence was precarious. Gold could not be found, and it was some years before the cultivation of tobacco, which was already used to some extent in England, was introduced. Even so, the Virginia Company never made any money; and the Virginia colony represented a heavy drain upon England of both men and capital, in the form of ships, supplies, and equipment.

In a general way, what was true of Virginia was true of every colony during its early years. The establishment of a settlement represented a heavy withdrawal of capital and of manpower from England; and it was many years before the new colony would become even self-supporting, to say nothing of making any return to the mother country. During the first half of the seventeenth century colonial enterprises were on a small scale, restricted by the very fact that there was still not enough capital to spare at home to enable empire builders to embark upon any very spectacular enterprises. Virginia, New England, Maryland, the Bermudas, and the plantations in the West India islands represent the sum of English colonizing activities during this time. After the Restoration, with the expansion of economic activity at home, larger-scale operations in colonial schemes became possible. Even though the West India colonies were fast becoming profitable, because of the high returns to be made from growing sugar, and though some individuals in England benefited, and many of the settlers in America won great advantages for themselves, English

economy on the whole probably was retarded down to the close of the century by the drains, unrequited by compensatory profits, of overseas colonies. It was not much before the beginning of the eighteenth century, if then, that the English settlements abroad began to return to the home country more than they required from her in the way of capital resources. On the other hand, it may well be that colonial enterprises, by their calls for capital, actually stimulated the creation of much of the capital which was invested in them. Had they not been undertaken, the energy of those who took part in them might not have found anything else to do and would have gone unused. Much of the English capital expended in the colonies was merely the sort of wealth in the material form of ships, supplies, and equipment which would never have come into being had there been no demand for them in overseas projects.

Whatever may be the truth of the matter, Englishmen of the time thought that colonies were, or could be made, the source of great profits. They had every intention, moreover, of monopolizing all benefits growing from colonial activity for themselves. Their sentiments are admirably summed up in the preamble to the Navigation Act of 1663. According to this preamble, the act was intended to keep the colonies in a firmer dependence upon the homeland and to render them yet more beneficial and advantageous unto it in the further employment and increase of English shipping and seamen, and the sale of English woolen cloth and other manufactures and commodities, "rendering the navigation to and from the same more safe and cheap and making this kingdom a staple not only of the commodities of those plantations but also of the commodities of other countries and places for the supplying of them, and it being the usage of other nations to keep their plantations to themselves." Before the end of the century the plantations had cut through this conception of their reason for existence by beginning to manufacture woolen cloth. "And whereas great quantities of the like manufactures had of late been made," said an act of 1699-1700, and "were daily increasing in the kingdom of Ireland and in the English plantations in America and were exported from thence to foreign markets heretofore supplied from England, which would inevitably sink the value of lands in England and ruin trade and the woolen manufacture thereof,"

the act discouraged the colonial manufacture of cloth. During the eighteenth century the same policy was persisted in, with special laws as circumstances arose.

Overseas Commerce

The story of overseas commerce is in a different case. By selling English goods abroad and buying foreign wares in exchange, great profits were made. There is every indication that the greatest fields for business of this sort were the densely settled and highly civilized areas close to England's own shores in Ireland and on the continent. The cost of transportation did not eat up the values of the goods themselves, the sale of English wares stimulated production at home, and the purchase of articles of European manufacture gave the English many kinds of goods which they were not fitted to make as well or as cheaply themselves.

The Volume of Foreign Trade

Something of the volume of foreign commerce and its increase can be gleaned from an examination of the customs revenues. These indicate that there was a steady rise in trade up to the year 1640, when the volume of commerce was almost double that of the first years of the century.

All authorities are agreed that the period of the Civil Wars and possibly of the Commonwealth and Protectorate witnessed a decline in commerce. Unfortunately customs records to substantiate these statements are not available. Without doubt, however, the tendency toward a larger volume of foreign commerce was resumed with the Restoration of Charles II in 1660. By the end of the seventeenth century the estimated value of the commodities which were exported from England is given, in one official statistical account, at £6,339,763, and the value of those imported at £4,789,823. The whole value of England's foreign trade was thus estimated at over £11,000,000.

There was no appreciable increase in this figure during the first twenty years of the eighteenth century, and in many years, owing particularly to decreased imports, the value of foreign trade did not reach the mark attained in 1700. In this same set of statis-

tical accounts there is some estimate of the tonnage volume of overseas trade. The import trade from the West Indies and America, valued at £1,226,701, comprised 51,112 tons. If all other trade had the same average value per ton, England's foreign commerce had by now attained a volume of 500,000 tons a year. Actually, the tonnage of all goods imported and exported was probably substantially smaller than this figure, since the colonial wares were much bulkier in relation to their value than the cloths, linens, silks, and wines which formed such an important element in trade. The carriage of 500,000 tons weight of goods would have provided work for 833 200-ton ships, allowing three voyages to each ship per year, with a cargo in one direction only.

In addition to overseas trade there was a great coastwise trade, particularly in coal. In the period 1685-1699 the coal shipments from the north of England ports in years of good trade averaged 800,000 tons a year, of which 85,000 tons were exported to the continent and 35,000 tons were shipped to Ireland, Scotland, the Channel Islands, and southwestern England. The remainder, larger in bulk than the whole of England's foreign commerce, was carried to the ports of the south and southeast and above all to London, which in this period consumed annually about 455,000 tons of coal.

With these various figures in mind, to give some hint of the dimensions of the things we are dealing with and the rate of their growth, it is now possible to consider in detail some of the outstanding developments in commerce.

English trade with most European countries was carried on by private merchants trading for themselves, with the result that its annals are rather scanty, except as the story is reflected in the biographies of great merchants or in the rising customs receipts of the time. In the case of the English trade with Turkey and with Germany and the Baltic countries something more is known, because this business continued to be carried on by trading companies, which have left fuller records of their activities. In the trade with Africa and Asia the trading companies also played a leading role. The earlier history of some of the great trading companies has already been told in previous chapters. In the following sections the story will be taken up from the end of the reign of Elizabeth and carried through the seventeenth century, with some indication of later company history.

The Merchant Adventurers

The Merchants of the Staple, the oldest of the English merchant companies, still continued to exist, but with the cessation of the export of wool, which was prohibited in 1614, the staplers had abandoned foreign trade and became commission merchants in the domestic wool trade.

The Merchant Adventurers, it will be recalled, enjoyed the monopoly of exporting unfinished English cloth. After leaving Antwerp, in Elizabeth's reign, they transferred their headquarters to Germany, where their privileges were assailed by the Hanseatic League and their trade was invaded by interloping English merchants. In 1611 they established themselves at Hamburg, where they remained except for certain years until Napoleon destroyed their organization in 1807.

The attack upon the Merchant Adventurers by their German rivals on the ground that they were a monopoly seems to have inspired the first English assault upon their privileges. Shippers excluded from the cloth trade denounced them as a monopoly, and shipowners alleged that they did nothing to encourage English shipbuilding either by using large ships or, like the Hanseatic merchants, by importing naval stores. No untoward legislation affecting them was passed on this occasion, but in the debates in Parliament and in the pamphlets assailing and defending their position written during the first quarter of the seventeenth century much was done to advance the notion that trade ought not to be monopolized by a single company. The privileges of the company were set aside in favor of the Alderman Cockayne's rival organization in 1614 but were again restored in 1617. Under Charles I the company was confirmed in its position, but it reduced its entrance fee to £50 in London and £25 in the outports. In 1643 the company won parliamentary support, and perhaps for this reason its privileges survived the flood of free trade sentiment which now ran so strongly.

After the Restoration, in response to new attacks, the entrance fees were reduced to 20 marks and 10 marks respectively. At the time of the Revolution of 1688 the German trade was virtually thrown open, although the company was permitted to continue

to operate for more than a century longer without any special privileges on an equal footing with English merchants.

The Eastland Company

In 1579, a year after the Hanse merchants in London had lost their special privileges, Elizabeth chartered the Eastland Company to carry on commerce with Scandinavia, Poland, and the German ports on the Baltic. The merchants of this company exported cloth and imported tar, hemp, cordage, and all sorts of naval stores. This company carried on a brisk trade during the first half of the seventeenth century and was reinstated after the Restoration. At this time Denmark, Sweden, and Norway were removed from the scope of its operations, and the entrance fee for admission into the company was reduced to 40s. The Eastland Company was founded by Elizabeth to advance England's maritime power. Its members seem to have allowed their best opportunity to do this to slip away from them, for the carrying trade in grain from Dantzic and other ports to the western countries passed into Dutch, rather than English, hands during the seventeenth century and became one of the mainstays of Dutch maritime supremacy.

The Joint Stock Companies

The Merchant Adventurers Company and the Eastland Company were organized as regulated companies and not as joint stock enterprises. That is to say, the individual members of these companies traded with their own capital and at their own risk and profit, under regulations laid down by the company. Joint stock companies, by way of contrast, traded with company capital, through paid officials known as factors, and the profits and losses were divided among the shareholders in proportion to the amount of stock held by them. In the regulated company each merchant carried on his own business under the company's rules and limitations. In the joint stock company the individual merchant did not trade in person. He advanced his capital through subscription to company stock, and the company traded as a corporate body through its hired agents.

During the sixteenth century the opening of trade with a coun-

try with which Englishmen had never carried on commerce presented great obstacles. Few single individual merchants had enough capital to provide ships and cargoes for a distant port, let alone make arrangements for warehouses and living quarters in the port, procure permits to do business, maintain consuls and ambassadors, give presents to rulers and extend credit to customers. The result was that in the business of extending English trade to new areas the joint stock company was generally used. Companies of this sort already formed in the Tudor period continued into the seventeenth century and new companies were created during the Stuart period.

There was general agreement that the joint stock company was one of the best arrangements for establishing a new trade, and in addition to that few seriously opposed the proposition that, in view of the unusual risks involved, the company was entitled to a grant of a monopoly of business in the country where it carried on business. As soon as the new business became profitable, however, other merchants began to question the validity of the grant of the company's monopoly and invaded the area. Such merchants were known as interlopers. They not only cut into every profitable trade wherever it was opened up, but at home they attacked the principle of the grant of trade monopolies and demanded the right to share the trade into which they had insinuated themselves. Once they succeeded in securing the recognition of their own position in the trade in question, often in the form of admittance into a certain share of the business, the interlopers themselves inevitably became champions of monopoly.

The Muscovy Company

The Muscovy Company, founded in 1553, was the oldest of the joint stock trading companies. At the beginning of the Stuart period it received a quite thorough going-over at the hands of a parliamentary committee in 1604.

The Muscovy Company, consisting of eightscore persons or thereabouts, have fifteen directors, who manage the whole trade; these limit to every man the proportion of stock, which he may trade for, make one purse and stock of all, and consign it into the hands of one agent at Moscow, and so again at their return, to one agent in London, who sell all, and give such account as

they please. This is a strong and shameful monopoly, a monopoly in a monopoly, both abroad and at home, a whole Company by this means, is become as one man, who alone hath the uttering of all the Commodities of so great a country.

In spite of bitter criticisms, the company continued to enjoy its monopoly, charging high licenses to other merchants to trade in their jurisdiction and insisting to the full on their exclusive rights in the whale fisheries. It was popularly supposed that the Russian market for English cloth could be greatly expanded if men of capital and initiative were free to export greater quantities at lower prices and that imports of bulky goods from Russia on a larger scale would employ many more English ships. The company suffered from political events in both England and Russia and from Dutch competition. In 1609, after many years during which virtually no business had been done, the joint stock was wound up, and the company became a regulated company. In 1698 Parliament passed a statute (10-11 William III, chapter 6) reducing the fine for admission to the company from £60 to £5. Thus, while the company was permitted to survive, the trade with Russia was virtually opened to all merchants who wished to participate in it.

The Levant Company

The Levant Company, which represented an Elizabethan merger of the merchants trading in the Mediterranean, remained as one of the most exclusive bodies of the seventeenth century. The Levant Company was a joint stock enterprise until 1599 or 1600; after that it became a regulated company. After reorganization in 1600 and in 1605 or 1606 the members of the company carried on a large export trade in cloth, which was sent to the company's factories at Smyrna and Aleppo, and they brought back to England valuable cargoes of raw silks, currants, drugs, carpets, and other eastern products. Although there was much competition from the French, who were settled in Turkey before the English merchants traded there, the company remained generally prosperous, and it was able to pay the costs of maintaining the English consuls and the English ambassador to Turkey. The company was given a new charter at the time of the Restoration;

from 1713 to 1717 the Turkey trade was "open," but the system of "well-ordered" annual fleets was then resumed until 1743. In 1753 the company was forced to admit members so freely that the Turkey trade was virtually "opened," although the regulated company continued to be responsible for paying the salaries of ambassadors and consuls in Turkey until 1803.

The Minor Companies

It is scarcely necessary to enter into a detailed discussion of the minor seventeenth-century trading companies, such as those trading to Greenland and to Africa. The privilege of fishing for whales in northern waters was one of the prerogatives of the Muscovy Company and in 1620 was sold to a separate undertaking, known as the Greenland Company. This company was soon involved in bitter controversies with interloping whalers from Hull and York, and it was seriously injured by the soap monopoly of 1634, which set out to make soap from other fats than whale oil, previously used. In 1636, in compensation for its losses, the Greenland Company received a confirmation of its whale-catching monopoly, but the disputes between the company and the interlopers continued well into the Restoration period. In 1672, on the ground that both the company and the interlopers had failed to provide England with whale oil in sufficient volume at satisfactory prices, the trade was thrown open to all Englishmen. Early in the reign of William III a new company was formed, with the grant of a monopoly of whaling.

From the time that John Hawkins' father, William, first traded for slaves and ivory on the Guinea coast of Africa in 1536, Englishmen were attracted by the possibilities of profits to be made in commerce and slaving in that area. In 1588 Elizabeth chartered certain merchants of London and Exeter as the Senegal adventurers, with the sole right to trade in Senegal and Gambia. In 1618 the Gynney and Bynney Company was chartered; in 1630 Sir Nicholas Crisp and Company, who had broken down the monopoly of the previous company, succeeded in obtaining a charter with a more extensive monopoly than their predecessors had had. After the Restoration the Royal African Company was organized, which continued, with various reorganizations, until 1750. These African companies all suffered from the competition

of interlopers, from the misfortunes of wars, and from the manipulations of financiers. Although good dividends of as much as 11 per cent were paid by the Royal African Company in certain years between 1676 and 1692, after 1700 the rate fell to one-half or three-quarters of 1 per cent. In 1713 efforts were made to open the trade to all Englishmen, subject to charges for the maintenance of the company's forts on the Guinea coast. The House of Lords rejected the Commons' resolution to this effect. In 1750 the joint stock company was dissolved after further manipulations of its capital by the financiers, and in 1752 the company's forts were taken over by the Crown. Thus, what had started as a trading company ended in the acquisition of a colony by the Crown.

Another company which might be included under the head of minor companies, at least at the time of its organization, is the Hudson's Bay Company. This organization was chartered in 1670 and is still actively engaged in the Canadian fur trade. In the reign of Charles I the Company of Adventurers to Canada was formed to trade for furs and "to plant" colonies in the vicinity of the St. Lawrence. After six years of activity, filled with struggles against interlopers and against the French, who were already active in Canada, this project came to an end. During the 1660's two French fur traders, Groseilliers and Radisson, penetrated to Hudson Bay by land, but, on their return to France, they found that the French Company of the West Indies and the West refused to countenance their private trade. They turned then to the English for assistance, and after an interview in 1667 with Prince Rupert, nephew of Charles I, the Prince assisted them in forming a syndicate to fit out a small vessel to sail to Hudson Bay, build a fortified station there, and trade with the natives. The expedition was such a success that the members of the syndicate decided to keep the future to themselves by securing a charter conferring a monopoly. In 1670 the Governor and Company of Adventurers of England trading into Hudson's Bay was incorporated. There were nineteen members of the company. The capital, including the sums spent for obtaining the charter, was £10,500, divided into 35 shares of £300 each. The profits were remarkable. In 1676 the merchandise exported did not exceed £650 in value; the furs imported were set down at £19,000. The French, of course, did not look kindly upon the presence of the English in the land which they considered their own, and during

the decade from 1680 to 1690 the French, by their attacks, inflicted heavy losses upon the company. In 1690 the company received parliamentary confirmation of its charter, and shortly thereafter it reorganized its capital structure. Since the company's assets were computed to be worth fifteen times its capitalization, the stock was trebled, just at the time the French began a series of successful aggressions which prevented any dividends until after the end of the War of the Spanish Succession (1702-1713).

The East India Company

The Governor and Company of Merchants of London trading into the East Indies received their charter on December 31, 1600, with a monopoly of trade and traffic between the Cape of Good Hope and the Straits of Magellan. Because times were hard, there was difficulty in getting the subscribers to stock to pay up their assessments. When the first "voyage" sailed in February, 1601, there were debts of £9,000 outstanding, in spite of the fact that all sorts of pressure including bonuses and threats of imprisonment had been used on the stockholders to induce them to pay up. The sailors and factors who sailed with the ships were given certain shares in the stock of the voyage. After various adjustments were made, the capital of the voyage of 1601 was computed at £68,373.

For some years each voyage was kept as a distinct entity, with capital raised from the members of the company for a particular expedition and a distribution of all proceeds, both on the capital and profit account, as the affairs of the voyage were wound up. Owing to the fact that the plague was raging in England in the autumn of 1603, when the ships of the first voyage returned, and business was at a standstill, it was decided to amalgamate the first voyage with a second, which set out in 1604 and returned in 1606. For this second voyage a capital of £60,450 was subscribed, of which all but £12,302 was expended in repairing the ships. Yet when the business of the first and second voyages was finally closed in 1609, it was found that a profit of 95 per cent had been made over and above the return of all the nominal capital, much of which represented bonuses on the amount actually paid in. Since some of the dividends were paid in East Indian goods, rated

at their wholesale price, or below it, the shareholders in a position to sell these goods advantageously stood to make a further profit. The success of the first two voyages established the English trade with India, and beginning with the voyage of 1607, vessels were sent to India each year.

From the beginning the East India Company had to face the danger of interlopers. In 1604 Sir Edward Michelborne, who had been disappointed in his desire to become commander of the first voyage and therefore failed to pay his stock subscriptions, received royal permission to undertake an expedition to China and other places in the East, notwithstanding any grant or charter to the contrary. So outrageous were Michelborne's piracies in the East that in many regions the English name was abhorred for years to come. In 1607 Richard Penkevell and his associates obtained from James I a grant for the discovery of a northern passage to China, Cathay, and other parts of the East Indies. To guard itself from future royal concessions of this sort, the company tried to bind James not to grant any license contrary to the tenor of their patent and to confirm their monopoly forever subject to a revocation clause on three years' notice. To quiet the criticism that the company was hindering the progress of geographical discovery, it joined with the Muscovy Company and other adventurers in seeking a northwest passage.

Meantime the company made really satisfactory profits. The third and fifth voyages, the accounts of which were amalgamated, showed profits of 234 per cent in addition to the return of the entire capital. The eleventh voyage of 1612 returned 320 per cent (including profits and distributed capital); even the sixth, the least successful of the early expeditions, returned 221 $\frac{2}{3}$ per cent (profits and capital distribution). In 1613 it was decided that the capital subscribed should be used for four voyages and in 1617 a second subscription for a group of voyages was arranged. At this time 954 persons (as compared with 101 subscribers who sought the company's charter from Elizabeth) subscribed a capital of £1,629,040.

Between 1613 and 1648 there were four "joint stocks" for groups of voyages of this sort; one in 1613, a second in 1617, a third in 1632, and the fourth in 1642. In addition there were three subscriptions for trade to Persia in 1628, 1629, and 1630; and two "particular" or "general" voyages, in 1641 and 1648. In

1650 the *United Joint Stock* was raised to be kept as a permanent capital to carry on the trade indefinitely. Actually only small subscriptions could be obtained at this time, and a second attempt was made in 1657 to create a permanent capital in the *New General Stock* authorized by Cromwell.

The company's success not only attracted capital in these remarkable amounts; it also awakened criticism and competition. In 1615 the writer of a pamphlet, *The Trade's Increase*, interested in advancing a fisheries scheme as a school for seamen, alleged that instead of building up the English merchant marine, the East India trade actually destroyed shipping, since of 21 ships which had made the voyage to India since 1601, four had been lost and the remainder returned home "crazed and broken." Of the 3000 sailors who had sailed in these ships, two-thirds were missing. Moreover, the company carried away the treasure of Europe to enrich the heathen by exporting bullion and bringing back unnecessary commodities. Finally it was claimed that no subjects of the king should be debarred from trading equally in all places.

In 1617 James, who was king of Scotland as well as of England, issued a royal license under the Great Seal of Scotland to Sir James Cunningham constituting the Scottish East India Company. The danger from this quarter was averted by the purchase of Cunningham's grant. The business depression of 1620 brought a new danger. The amateur economists of the day assigned responsibility for the crisis to the exportation of bullion and attributed to the East India Company special blame because the company was known to export large amounts of gold and silver, since the East wanted little else from Europe. The company thought it worth while to state its case in reply to such criticism. Thomas Mun, in his *Discourse of Trade from England unto the East Indies* (1621), pointed out that, while there was a certain amount of bullion exported to the East to buy spices there, great amounts of the spices brought to England were re-exported to Europe in return for bullion, so that the East India trade actually increased the country's bullion supply. Moreover, he contended that the nation got cheaper spices because the trade route via the Cape of Good Hope was less expensive to operate than one through the Mediterranean. Edward Misselden, in his *Free Trade or the Means to make Trade Flourish* (1622), expressed the view that the special remote cause of the prevailing scarcity of money was

the large amount of capital employed in India which had not yet been returned to England in the form of a division of assets and profits among the company's stockholders. To the contention that the Indian trade should be open to all, "that all subjects should be alike free to be merchants in all trades," he replied that it was against public policy that all should be merchants and that it had ever been the policy of the state "to reduce trades to corps and societies." In view of the distance involved in the East Indian trade, efforts to carry it on "without government" were "like men making holds in the bottom of a ship in which they are, passengers." Gerald Malynes, in his *The Maintenance of Free Trade* (1622), was more guarded in his support of the company. While he approved of the reduction made in the price of spices as a result of the company's trade, he felt that there were defects inherent in the control of the company by a few officials and in the limitation of its commerce to the port of London.

Although the company successfully weathered the criticisms which were brought against it in the Parliament and elsewhere, it did not escape the depression of 1620 and during the following decade serious financial problems were met by a kind of fiscal jugglery which would do credit to company officials of a more sophisticated era. In addition, the Dutch virtually excluded the English from the Spice Islands. They gave dramatic notice to the world that in the future the English were to be limited to the less important trade with the Indian mainland by massacring the English on the island of Amboyna in the year 1623. Worse still, the company incurred the enmity of King Charles I first by refusing to lend him £10,000 and then by endeavoring to secure parliamentary support in its efforts to obtain redress against the Dutch. In 1635 Endymion Porter, a prominent courtier, received a license to fit out two ships as privateers. The money to equip this expedition was advanced by a syndicate closely associated with Sir William Courten, a prominent London capitalist. Porter's venture suggested to Courten that there might be great profit in forming a new company to trade, under royal license, with Portuguese India, which had been opened to English commerce by the convention of Goa.

In the new syndicate the king was credited with £10,000 stock without payment, and Windebank, the secretary of state, was put down for £1,000 on the same terms. One of the largest sub-

scribers was Sir Paul Pyndar, who advanced £35,000 out of the total of £120,000 actually raised. Six ships were made ready, and, in spite of the protests of the East India Company, the king authorized the new company, known as *The Adventurers to Goa and other parts*, to trade to all places where the East India Company had not established factories or trading stations. Although the ships of the new syndicate acquired rich cargoes in the East, the vessels were eventually all captured or destroyed by the Dutch. Yet before this was known in England, the threat to their monopoly caused so much concern among the members of the East India Company that many were in favor of abandoning the trade and winding up the affairs of the company.

Matters were made even worse when in 1640 Charles compelled the company to turn over to him (on the security of the farmers of the customs) pepper worth £63,283, so that he might throw it on the market for cash, regardless of its value. At the same time Courten's association showed signs of revived life, and although its second trading voyage was a failure also, it did establish a station on the island of Assada near Madagascar, where it coined false money which was circulated in India. Since the East India Company was responsible to the native rulers for the delinquencies of all Englishmen, it had to make good the damages claimed against Courten's association on this and other grounds. In 1645 two East India Company ships were wrecked, involving a loss of £66,000; and the company's assets were put down as only £60,000 more than their debts, as against a capitalization of £105,000. On the other hand, profits were being made in current trade, and it would have been foolish to liquidate the enterprise. In 1649 and 1650 the Parliament and the Council of State of the Commonwealth tried to resolve the problem by ordering the virtual amalgamation of Courten's association and the East India Company into a single joint stock company, empowered to raise £300,000 in capital, to be known as the *United Stock*, to carry on the East Indian trade. Times were uncertain, and of the £300,000 to be raised only £30,200 seems to have been subscribed.

For the moment there was more interest in pressing claims for indemnity against the Dutch than in trading; and when the war with Holland came to an end in 1654, the company secured the payment of an indemnity of £85,000 and the promise of the restitution of the spice island of Pularoon. The problem of the proper

division of the indemnity among the various joint stocks of the company now occupied attention; meanwhile the company lent £50,000 of the sum received from Holland to the Protectorate government. In view of the desire on the part of many members of the company to wind up its affairs or to conduct trade in the future along the lines of a regulated company, Cromwell issued a new charter in 1657, providing for the maintenance of the Company's monopoly and the subscription of new capital. In spite of bad trade, the sum of £739,782 was subscribed to the New General Stock. The assets of the older joint stocks were purchased and preparations were made to prosecute the India trade vigorously. But business took a turn for the worse before the stock payments were called for, and it was at last decided, in view of the depressed conditions of 1659, to call up only 50 per cent of the subscriptions. Thus the New General Stock actually started operations with a paid-up capital of only £369,891.

When Charles II returned to his throne in 1660, the East India Company was one of the first bodies to offer its address to him, and at the same time it made him a present of a service of plate worth £3,000, while his brother, the Duke of York, received £1,000 in cash. Shortly after this the company obtained a royal charter. This grant renewed the rights of the company and, in addition, empowered it to make war upon any non-Christian prince within the limits of its monopoly.

In 1664 a valuation of the company's assets was made. Since 1657, 60 per cent in dividends had been paid, and in addition over £125,000 had been put back into the business. The publication of this fact so aroused the cupidity of the stockholders that they forced the division of these reserved profits in 1665, when a dividend of 40 per cent was paid. In 1666, because of the disturbed conditions occasioned by the war with Holland, the company announced that it would repay some of its capital in the form of the distribution of a dividend of 50 per cent in 1667. This was partly due to the difficulty of using the capital on hand in trade and partly to the fear that royal fiscal requirements might compel the company to lend large sums to the king. Even so, the company had to lend £50,000 in 1666 and £70,000 in 1667. With the return of peace and good times in 1668, the company set aside all profits to provide capital to carry on its rapidly ex-

panding business. In addition, considerable amounts were borrowed.

In 1671 the directors issued a balance sheet which showed gross assets of £1,007,113; liabilities of £398,275 (including debts, loans, and a 10 per cent dividend which had just been declared) and net assets of £608,837 against a paid-up capital of £369,891, of which 50 per cent had been returned in 1667. The gross assets were broken down as follows:

Debts due to the company	£ 136,735
Value of eight ships	17,709
Balance at Surat	170,586
Balance at Bantam	129,213
Balances elsewhere in the East	235,709
Goods in England	313,255
Cash	3,902
Desperate debts £65,542	
	<u>£1,007,113</u>

In 1672 a dividend of 40 per cent was paid; in 1673 and 1674, 20 per cent in each year. During 1675 and 1676 war in India to defend its factories cost the company £400,000 and no dividend was declared, but in 1677 40 per cent was paid.

In spite of its great prosperity, and to a certain extent because of it, the company faced much opposition. It exported bullion and it imported calicoes, muslins, and silks, the sale of which in the home market was believed to react disadvantageously upon the English woolen cloth trade. Interlopers continued to be on the alert for opportunities to participate in the rich trade of the East. In 1670 the Levant Company, injured by the competition of the East India Company, launched an attack upon the East India Company. The Levant Company exported cloth, rather than bullion, and it was thus able to muster the support of the clothing interests and of those economists known as bullionists, because they opposed the export of gold or silver. After the East India Company loaned the king £90,000 in 1676 and 1678, it obtained a new charter, confirming its rights and privileges. In the seven years from 1675 to 1681, inclusive, the company paid 150½ per cent in dividends. Large sums were put back into the business, so that in 1678 the net assets of the company stood at £1,250,000.

In 1680 the Levant Company renewed its attack upon the East India Company. Though the Levant Company failed to convince either the Privy Council or Parliament that the profits of its members were more in accord with the national interest than were the profits of the East India Company, the discussion led to another project for the organization of a rival to the East India Company to share its trade monopoly and to extend England's commerce with the East. To keep the support of Charles II, the company began the practice of making him an annual present of 10,000 guineas. Charles responded by refusing the petition of the interlopers and by granting, in 1683, a new charter to the company. At the same time the company decided to extend the scope of its business by securing more capital. Before this was done, however, it was felt that certain adjustments in the capital structure of the company ought to be made to protect the rights in the undivided reserve of the existing stockholders. The reserved profits were equal to more than twice the paid-up capital. Accordingly, a cash dividend of 50 per cent was paid, and a stock dividend equal to the paid-up value of existing stock was issued.

Before the subscriptions to new capital were opened a bitter personal feud between Josiah Child, the governor, and Thomas Papillon, the deputy governor, split the company.

The issue between Child and Papillon, which disturbed the company for a number of years, was finally caught in the meshes of government finance; and in the last analysis the only interest which made anything out of their quarrel was the Treasury. In 1698 Treasury officials, at their wit's end for money, conceived of the possibility of coupling the franchise for the East Indian trade with a loan to the Crown, as had been done in 1694, when a syndicate which advanced a large sum by way of loan was incorporated as the Bank of England. The company offered to write down its capital to £787,304, take new stock subscriptions for £712,696, and lend £700,000 to the king at 4 per cent. Papillon countered with a proposal to lend £2,000,000 at 8 per cent.

The bid of the company was rejected in favor of the offer of Papillon and his syndicate, but the company was able to secure certain concessions in the parliamentary act which authorized the loan. The company was to be allowed to continue for three years, under the clause in its charter which provided for three years' notice of dissolution, and it was to be permitted to subscribe in

its corporate capacity to some part of the £2,000,000 to be raised by the Papillon syndicate.

Under the Act for raising a Sum not exceeding two millions, upon a fund for payment of Annuities after the rate of Eight Pounds per cent per annum, and for settling a trade to the East Indies, all subscribers to the loan were entitled to the same proportion of trade to India as that which they held in the loan. The larger part of the loan was subscribed by Papillon's syndicate; but the East India Company took up £315,000 and was thus entitled to about one-sixth of the trade to India. Papillon's syndicate, now incorporated as the *English Company trading to the East Indies*, was entitled to about five-sixths.

The English or New Company soon discovered that while it now had a predominant position, legally, in the East Indian trade, most of the technical knowledge relating to business in the East was in possession of the Old or London Company, that the factories and stations in India were all the property of the Old Company, and that since all its subscribed capital had been lent to the government, it would be necessary to raise working capital by borrowing.

As a business enterprise the New Company was not very profitable and before long a movement was set on foot to unite the two companies. In 1702 a working agreement between the two organizations was arranged, and in 1708 they were merged into the United East India Company. Curiously enough, the Treasury took further advantage of the situation to arrange another loan of £1,200,000 to the government by the shareholders as the price of the state's blessing on the union.

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Chapter 14

BANKING AND PUBLIC FINANCE

Banking during the Seventeenth Century

A BANK is an institution where men may deposit their surplus funds for safety and convenience until they need them, and where others in need of money may borrow to meet their requirements up to the limits of the security they can give. By the operations of receiving deposits and making loans, banks actually act as agencies for mobilizing capital and for diverting that capital to such uses as seem good to the banks' officials. Banks also deal in subsidiary operations, such as transferring money or arranging to offset sums due to merchants in distant places by means of bills of exchange; they buy and sell coins of different countries; and they deal in gold and silver bullion.

Although the operations of mobilizing capital and providing for its use by merchants and manufacturers through various credit arrangements became increasingly important during the seventeenth century as commerce and industry expanded, the exchange operations of bankers and their trade in coins and bullion formed the bulk of banking business in earlier centuries. During the Middle Ages the transfer of accounts to and from England by means of bills of exchange was in the hands of continental merchants. Englishmen did not take part in this business until the Tudor period. When Englishmen did engage in banking operations, traders from four groups entered the field. These were the merchants, the brokers, the scriveners and the goldsmiths.

During the reign of Henry VIII Stephen Vaughn borrowed money in Antwerp from the Fuggers, the Welsers and other continental bankers on the security of the bonds of English merchants. During Elizabeth's reign Thomas Gresham, the most famous English merchant of his day, borrowed large sums on

the queen's behalf in the Netherlands and he negotiated loans on her account in England also. Throughout the Elizabethan and Jacobean periods the Crown frequently borrowed from the merchants and merchant companies of London. During Elizabeth's reign certain merchants carried on important transactions in exchange and in shipping bullion to pay the English forces in the Netherlands and in France. These "exchanging merchants" charged a certain percentage for their services and for their risks. The business of exchange was so profitable that a number of brokers and certain scriveners got into it also. Brokers were intermediaries between merchants and added to their business by knowing those who had money to lend and those who needed it, "acting impartially between them both." When the joint-stock companies, such as the East India Company, appeared with marketable shares the brokers began to buy and sell stock for their customers also. Specialized types of brokers, those who acted as middlemen in the purchase of corn and wool from the growers, provided credit against the next crop for the farmers as early as the thirteenth and the fourteenth century. They were well established in this business during the Tudor period.

Among the earliest bankers the scriveners are of especial importance. They were originally clerks who wrote contracts, bonds, and other business documents. They were thus in a good position to secure an intimate knowledge of arrangements between buyers and sellers and to see the possibilities of providing loans at the proper times. Scriveners seem to have been the first group to receive deposits from others, for the express purpose of lending the money so received to their customers, and scriveners continued in this type of banking business well into the seventeenth century.

As a receiver of deposits and dispenser of credit the merchant goldsmith, whose business was the manufacture of gold and silver plate and jewelry and the purchase, mounting, and sale of jewels, was eventually to overshadow the scrivener. During the early seventeenth century the goldsmiths expanded their interest in banking and became most important factors in the economic life of the country. They received deposits, supplied loans, dealt in bills of exchange and in certain forms of royal obligations, bought and sold foreign coins and bullion, and introduced the use of the goldsmith's note (banknote) and the check.

The extensive development of banking before the seventeenth century had been checked by the general belief that it was wrong to take a profit for the use of money. The church taught that, since money was sterile and did not breed, payment for its use was sinful. In England and in other countries the taking of interest was illegal by statute. Not until the sixteenth century was a distinction recognized by law between usury and interest, between what was extortionate and not to be permitted and what was fair and allowable. Such a distinction had long since been worked out between merchants and lenders in practice. In 1545 a statute (34 Henry VIII, chapter 9) condemned usury but permitted interest at 10 per cent. An Edwardian act of 1552 reversed this decision and forbade interest as well as usury, but in 1571 the act of 1545 was revived. Finally, in 1624 the *Act Against Usury* expressly prohibited excessive rates but permitted interest payments of 8 per cent. In 1651 the legal rate was reduced to 6 per cent. Long before this act was passed the foreign loans of Henry VIII, Edward VI, Mary and Elizabeth, often made with express dispensations of existing statutes, had acquainted the public with the practice of borrowing and paying interest to the lender.

When Henry VII of England entrusted his surplus funds to merchants with the understanding that they were to use the money to expand their business operations to the point of paying certain amounts in customs on the goods which they imported, he was actually engaging in one of many well-known arrangements which had been worked out between merchants and capitalists to evade the prohibition of the payment of interest. The statutes of 1545, 1571, and 1624 were merely efforts on the part of the law to catch up with the facts of business practice and to simplify the business of trading and working on borrowed capital.

During the same time that the utility of loans at interest was recognized there had come about certain developments in the business of mobilizing and distributing capital. During the sixteenth century it was a common practice for men to keep great amounts of gold and silver on hand in the form of silver plates and gold neck chains which could be worn on the person. Sir Thomas Gresham, for example, was found, at the time of his death in 1579, to have a large part of his fortune invested in solid gold necklaces. Others secreted their funds in secret hiding-places around their houses. Samuel Pepys in 1677 had a hoard

of £1,300 upon which he could lay his hands at two hours' notice, and he always carried £300 in gold in his money belt. Sir Dudley North, in 1680, pestered by goldsmiths who wanted his business, replied to one who asked him where he kept his money with the query, "Where should I keep it but in my own house?"

Yet more and more, even during the sixteenth century, men with large sums of money in their possession hesitated to trust it to the safety of their own strong boxes and deposited it for safekeeping with the officials of the Mint in the Tower. In 1640, Charles I took advantage of this practice to seize the deposits entrusted to the keeping of the Mint in order to obtain immediate cash and thereby helped precipitate the financial crisis which led to the meeting of the Long Parliament in the fall of the year.

At the same time, certain principles were laid down by the judges, which made banking progress possible. Of such new rules of law the most important were those which involved a development of the common law principle of *bailment*. Under the common law if a man deposited an article with another person, property remained in the depositor. The Elizabethan judges took the view that this remained true of money, provided the coins were in a sealed box and given to the goldsmith merely for safekeeping. Otherwise, since coins bore no mark of identification, the money deposited actually became the property of the goldsmith to do with as he pleased, and the goldsmith became the debtor of the depositor for an equivalent sum. Such rulings gave a great impetus to banking, for they permitted the goldsmiths to use deposits as they saw fit, particularly for the purpose of making loans bearing interest. So profitable did this business of taking deposits and lending money at interest become, that early in the seventeenth century the bankers began to pay a certain amount of interest on deposits to attract depositors.

The disorders of the Civil Wars seem to have stimulated the progress of banking. A tract written in 1676 speaks of a time "thirty years ago" (1646) when masters began to deposit their money with the goldsmiths as their cashiers began to leave them in the lurch. Goldsmiths welcomed the new business and "began to receive gentlemen's rents and indeed any man's money and to allow them some interest on it though it lay for a month only or less . . . this new practice giving hopes to everybody to make profit of their money until the hour they spent it and the con-

venience . . . to command their money when they pleased which they could not do when lent at interest upon personal or real security. These hopes, I say, drew a great cash into these new goldsmiths' hands and some of them stuck to their old trade, but every one of them that had friends and credit aspired to this new mystery to become bankers and cashiers."

At first when the goldsmith banker made a loan, he paid out to the borrower the actual cash money which he had in his strong-box. The goldsmith bankers soon came to see the possibilities of further profits if they could keep the cash and merely give an order entitling the bearer to call for it. The use of such orders developed in several ways. Bankers issued deposit slips signed with their names. It was held by the courts that such deposit slips entitled the bearer on demand to the payment of cash; and as such slips or "running cash notes" were passed from hand to hand they took the place of actual specie. In 1675 a depositor wrote an order on his banker for the payment of cash to a third person. This order for £9 13s. 6d., dated August 14, 1675, is the oldest preserved check.

The Restoration of Charles II was followed by a rapid development in commerce and industry which was reflected in a remarkable extension of English banking. A number of great banking "shops" appeared in London, such as Sir Robert Vyner, Edward Backwell, Gilbert Whitehall, and Isaac Meynell and partners. As the number of "shops" increased and public familiarity with bankers' orders grew, another type of paper was introduced, which was a promise to pay a certain sum to the bearer on presentation. Such an order was a banknote. Because of confidence in the banker's ability to make payment upon presentation, it passed current from hand to hand, and might not be presented for payment for a long time. The banker thus put out at interest not only the money he actually had on deposit but orders on that money, trusting that depositors and holders of banknotes would never demand payment at the same instant. Bankers thought of banknotes as a means of making additional profits; but in reality banknotes performed a more valuable social function. They made it possible for entrepreneurs, on the pledge of their fixed capital, such as ships and warehouses, backed by their technical skill, knowledge of business, and reputation for personal integrity, to

get control of large volumes of goods, scattered in many hands, and to use them as new capital in their enterprises.

In actual practice, there were many defects in the English banking structure as it developed after the Restoration. The bankers, in spite of the legal limitation of interest to 6 per cent, charged what the traffic would bear, which in some cases was as much as 33 per cent. They gave inadequate security to their depositors, and it was charged that through bankruptcies on the part of goldsmith bankers two or three million pounds were lost to depositors within a comparatively short period. Thus Richard Thompson and Company had embarked in ventures in the wine, silk, and Russian trades. They were interested in interloping expeditions to India, in mines, and in Irish manufacturing, and they dealt in exchange. In 1675 there came a run on this house and it went into bankruptcy with great losses to its depositors. There had long been a feeling among businessmen in London that the joint stock banks, such as the great state Bank of Amsterdam, provided better security for depositors and gave better service to businessmen than the English goldsmith bankers did.

As early as the reign of Elizabeth suggestions had been made for the opening of a bank under some form of public sponsorship. Between 1571 and 1580 there were four proposals of this sort beginning with a bill for establishing seven "principal banks or stocks of money," to be called "banks of relief of common necessity" in London and six other towns. Many other schemes were brought forward during the reigns of James I and Charles I. In 1646 came two rather elaborate plans for the establishment of banks in London on the model of the Bank of Amsterdam and other continental cities. These were followed by many others, but until the decade of the 1690's nothing of permanent value was accomplished.

Beside depositors and traders the Crown was interested in adequate banking facilities. For a long time the English kings had used various devices to secure ready money in anticipation of revenues. All the Tudors occasionally resorted to forced loans extorted from subjects and guaranteed as to repayment by writs under the privy seal. Henry VII repaid his loans; Henry VIII generally secured remission of the obligation to make repayment by act of Parliament; and Elizabeth began to make repayment with interest. In the later years of James I's reign the promised

interest was defaulted, and the Exchequer officials only entered loan obligations in their accounts so that there might be a record, and not because there was any prospect of repayment. Henry VIII, Edward VI, Mary, and Elizabeth had borrowed heavily abroad from the bankers who had agents in Antwerp, paying 12 or 14 per cent and in addition purchasing jewels and commodities at excessive prices from the lenders. The Merchant Adventurers, the staplers, the Levant Company, and the East India Company also made frequent advances to the Crown.

One of the most usual ways of anticipating revenues was through the assignments by tallies. The tally was the ancient form of receipt given at the Exchequer to a collector of royal moneys. Even in the sixteenth century it was quite a regular thing to issue these receipts for specific amounts to be paid by certain collectors to royal creditors, who then called upon the collectors to make their payment to them in exchange for the tally receipts. At critical times tallies were frequently issued in great volume, often several years before the revenues in question were due, and consequently they were held at considerable discounts.

A more extended system of anticipations of revenue was developed during the Interregnum and after the Restoration. Cromwell frequently called upon the goldsmiths for ready cash, assigning certain revenues for repayment. When Charles II returned in 1660 he had to find between two and three hundred thousand pounds immediately to pay off and disband the Cromwellian army. "None could supply those occasions but the bankers which brought the king's ministers first acquainted with them, and they were so well satisfied with their proceedings that they did always declare that they were so necessary to the king's affairs that they knew not how to have conducted them without that assistance." The bankers so increased the interest which they took for their accommodations that Pepys noted that at one time the Treasury was paying 15 and even 20 per cent, which was "a most horrid shame." Nor, he added, should the goldsmith Maynell be suffered to make an income of £10,000 a year in this way.

In 1672, when Louis XIV declared war on Holland, Charles, who was in alliance with him, dared not call Parliament to get necessary funds. Rather than face popular discovery and denunciation of his diplomacy, Charles stopped all payments on all

royal warrants, orders, and securities for a period of twelve months. The king owed the bankers £1,300,000 at this time, of which £416,724 was due to Sir Robert Vyner. Many families were seriously embarrassed by this suspension. Eventually, in 1701, about one-half of the original sum owing was ordered paid at 3 per cent per year. The whole debt was to be considered canceled when £664,263 had been repaid.

The Stop of the Exchequer, as Charles II's act of 1672 was known, was one of the developments which again directed attention to the establishment of a joint-stock bank, and in 1676 a *National Bank of Credit* was actually opened to lend money on goods. By 1683 it had failed.

The Establishment of the Bank of England

During the reign of William and Mary England joined Holland in her resistance to Louis XIV. Parliament assumed the responsibility for the maintenance of the English naval and military forces. In order to raise immediate funds it gradually developed the practice of voting certain revenues and using them, together with such sums as it could pinch off from the king's own civil list, as funds to guarantee the interest and the ultimate repayment of the principal of large loans raised through the sale of "stock" or, as we say, of government bonds.

Before this solution of the problem was found, various experiments with getting huge sums in cash for the purposes of the war were carried out. In 1693 the *Parliamentary Committee* appointed to consider means for raising funds to carry on the war received two proposals to couple a large loan to the state with the grant of a franchise for setting up a joint-stock bank. Parliament rejected the favorable report of the Committee.

Meanwhile the Crown was so hard pressed for funds that to raise £100,000 King William's ministers had to go from shop to shop throughout London, offering bonuses or premiums of 30 per cent. In the following year, 1694, Charles Montagu, Chancellor of the Exchequer, after trying a lottery loan among other devices, recommended the acceptance of an offer from a syndicate headed by William Patterson to lend the Crown £1,200,000 at 8 per cent interest in return for a charter incorporating the subscribers as the Governor and Company of the Bank of England.

The Tonnage Act (5-6 William and Mary, chapter 20) gave effect to Montagu's recommendations, and on July 24, 1694, the charter of the new bank was sealed.

So eager were people to deposit their money in the new chartered joint stock bank that the subscribers were called upon to pay up only £720,000 of their subscriptions. The remaining £500,000 to be lent to the Crown was advanced out of deposits. Since the bank received 8 per cent on the entire sum of £1,200,000, its earnings for the first year were $13\frac{1}{2}$ per cent, less whatever sums it paid in interest to its own depositors. As a result of the success of the new bank, many other schemes for joint stock banks were brought forward within the next few years. Of these the Land Bank project has already been mentioned. None of the rival banking schemes was successful, and the Bank of England remained all through the eighteenth century as the one joint-stock company chartered to engage in the business of general banking.

Public Finance During the Seventeenth Century

For more than two centuries before the advent of the Stuarts the kings of England had been experimenting with the so-called "direct" taxes, in the form of subsidies and fifteenths and tenths, with a view to finding a secondary source of revenue to supplement the king's ordinary income in times of war or other emergency. These efforts had reached a climax during the last fifteen years of Elizabeth's reign, when the semi-annual and even quarterly visits of the queen's collectors became so regular that many people feared that they would become permanently established. The very likelihood of this development determined many among the political and propertied classes to prevent its materialization.

The Failure of the Subsidy

Elizabeth could fall back on the fact that England was at war with Spain to justify her repeated requests for parliamentary aid. By making peace in 1604 James I cut away that ground, and before very long members of his Parliaments began to show reluctance in the matter of voting further appropriations of this sort. In 1601 Parliament had voted four subsidies and eight fifteenths and

tenths, payable in four years. Lower assessments and smaller collections after James I's accession reflected the nation's uneasiness lest these taxes become a regular fixture; and when the unprecedented appropriation of 1601 had been garnered in, the new parliamentary grant of 1606 was keyed in such terms as to express the popular desire not to go on with the levies. For instead of four whole subsidies and eight fifteenths and tenths payable in four successive years, the vote of 1606 granted only three subsidies and six fifteenths and tenths and then spread out the collection of the third subsidy and its adjunct fifteenths and tenths over two years. In 1610 Parliament refused to give more than a single subsidy and one fifteenth and tenth; and after this levy was collected no further taxes of this kind were voted until 1621.

During the war period between 1621 and 1628 the government turned back to direct taxes. Two subsidies, without any fifteenths and tenths, were granted in 1621; three subsidies and three fifteenths and tenths were voted in 1624; two subsidies unaccompanied by fifteenths and tenths were appropriated in 1625, and five in 1628. The collections coming in from these taxes were decidedly smaller than had been the case twenty years earlier. A single subsidy and two fifteenths and tenths of the grant of 1601 were worth approximately £130,000. The two subsidies of 1621 unaccompanied by fifteenths and tenths yielded £72,500 each; the three subsidies and the three fifteenths and tenths of 1624 brought in £278,000 or £92,000 odd for each subsidy and its accompanying fifteenth and tenth. The appropriation of 1625 was worth £126,986 or about £63,000 for each subsidy; and that of five subsidies of 1628 produced £275,000 or £55,000 for each separate subsidy. The vote of 1628 marks the end of the long effort to raise revenue by direct taxes laid on landed or personal property according to the late medieval tradition. Such rapidly diminishing rates of return rendered impolitic the further reliance upon this type of revenue, especially in view of the opportunity of embarrassing the Crown afforded to parliamentarians, whenever such levies were proposed in the House of Commons.

During the early Stuart period the clergy were still taxed separately by means of clerical tenths, voted in convocation and approved by Parliament whenever a subsidy grant was made. After the Restoration it was agreed between the king and the archbishop

of Canterbury that in the future the special taxation of the clergy should cease.

Actually the abandonment of "direct" taxes by the early Stuarts was scarcely regretted by the Crown officials. Like everybody else they believed that "the king should live of his own" and that direct taxes of parliamentary origin were measures distinctly subsidiary to other kinds of royal income. They were glad to have tax revenue when it came in, and sometimes they did not know how to do without it; but their professional concern was rather with other varieties of resources. The rents of Crown lands and the receipts from customs were still, in their opinion, the best basis of public finance. These revenues were certain, predictable, unfluctuating, and safe from political discussion.

The Crown Lands

The Crown estates inherited by James I from Elizabeth were still very considerable, in spite of the Elizabethan sales made to finance the war with Spain. Down to the period of the Civil Wars, except for certain years during the latter part of the reign of James I, the yield of the rents of the Crown estates tended to increase. Whereas during Elizabeth's reign upward movements in the Crown income from rents had been due to the acquisition of new holdings, during the Stuart period advances in land revenue income resulted chiefly from improved management. Pensions resting on the land were cut off. Fees of surveyors, auditors, and other agents were reduced. Some attempt was made to raise the rents of individual estates to their economic levels, and with this end in view, early in James I's reign an elaborate survey of all Crown lands was undertaken to discover their actual market value. Actually, however, rents were raised only in exceptional cases. On the other hand, fines for renewing leases were increased considerably.

An important item in the revenue from the Crown lands continued to be the moneys coming from land sales. James I and Charles I relied even more constantly than did Elizabeth upon sales of landed property to keep them solvent. James I sold land worth £27,311 annually for £654,952 during the course of his reign, and Charles I alienated properties of almost equal value for £642,000.

In view of such extensive sales the maintenance of a rising rent roll is an achievement all the more remarkable. The estates of the house of Lancaster, which were incorporated with the Crown by Henry IV in 1399, were managed in a separate department of revenue known as the Duchy of Lancaster. The yield of the rent of the Lancaster lands remained almost the same from the beginning of the reign of Elizabeth until the outbreak of the Civil Wars. On the other hand, the third group of estates in the hands of the Crown, those of minor heirs managed by the Court of Wards and Liveries, showed a remarkable increase from year to year. At the beginning of Elizabeth's reign the queen's feudal rights of wardship and marriage had yielded roughly between £15,000 and £20,000 a year. In the year 1640 the receipts in the Court of Wards stood at £84,000, a sum almost as large as the income from the Crown lands proper.

The Customs and Impositions

On the whole, in spite of absolute increases in value, the land revenues tended to become relatively less significant as the Stuart era advanced because of the accelerating volume of government disbursements. Land rents and revenues showed nothing like the elasticity requisite to afford real help in the face of sky-rocketing expenditures. In consequence the interest of royal fiscal agents was turned more and more to the customs, which, as had already been discovered by Elizabeth, were capable of amazing expansion. Tentative increases in duties of various sorts made by Elizabeth during the last five years of her reign were followed in 1604 by a new Book of Rates, the first thorough revision since 1558 of the official valuations upon which duties were paid. On certain articles the valuations were unchanged, and the specific duties levied on cloth remained as they had been fixed by Queen Mary. In other cases valuations were raised by 25 or 50 per cent, and in a few instances by 100 per cent.

Certain merchants, restive under the implications of the new customs policy of forcing the merchants to contribute heavily to the support of the state, decided to test impost duties on currants, laid by Elizabeth and continued by James. The Court of Exchequer in the Bates case found that such new levies, if made for the benefit of the realm, were within the king's prerogative,

without the necessity of parliamentary approval. This decision, which was good law in view of Tudor precedents, was the basis for a number of new duties which culminated in 1608 in a royal patent authorizing a general imposition on imports and exports, equal to the ancient subsidy of 12*d.* in the pound of the value of the goods. Because of the opposition of the trading community to the new duties, in 1610 they were remitted in the case of most exports, but they were retained in the case of imports.

The success of the new impositions from the fiscal point of view was so great that further levies in the future were inevitable. The first extension came in 1613 when Lionel Cranfield, a leading London merchant, proved the legality, justice, and desirability of taxing aliens more heavily than native merchants. An additional impost of 3*d.* in the pound of value accordingly was laid on goods carried through the customhouse by alien merchants. In 1618 an additional duty was placed on every piece of cloth exported, on the ground that when Mary fixed the cloth duties in 1558 she did not take all that the Crown was entitled to on the basis of the duty on an equivalent amount of wool. Her failure to do so did not nullify the rights of the Crown to the sums thus "overslipped" or "praetermitted," and they were accordingly now to be collected. Some of the sting was taken from the levy by the provision that alien merchants were to pay double the duty exacted from natives.

In 1622, on the ground of the imminence of war with Spain, a new imposition was laid on hops and on French, Rhenish, and sweet wines equivalent to all existing duties. The levy was limited to a single year. Before it was to terminate the merchants were induced to strain themselves to make an offer of a permanent duty of 20*s.* per tun on wines imported into London and of 13*s.* 4*d.* per tun on wines imported elsewhere in England. In 1622 a further imposition of 9*d.* in the pound for the defense of the Palatinate was laid upon all goods imported or exported by alien merchants.

The new impositions were never popular and were seriously questioned both in Parliament and in economic pamphlets. When Charles I became king in 1625 the whole policy of basing royal finance so largely on the customs was called into question in Parliament. It was recognized that the customs policy of the Crown was so successful that it might eventually end the possi-

bility of the establishment of effective parliamentary control over the affairs of state. Instead of granting the king the right to collect the older customs duties of tonnage and poundage for his life, as had long been the practice at the beginning of a reign, the vote was limited to a single year. At its end Charles proceeded to collect all the duties in question as impositions by virtue of his prerogative power. The parliamentary challenge of the king's right to do so came to a head in the famous resolutions of 1629, which declared the payment and collection of tonnage and poundage to be treason. The forcible dissolution of Parliament was the king's reply. Merchant resistance to the royal measures culminated in attempts to take goods seized for non-payment of duties from the king's warehouses; but the lawlessness of the merchants in doing so lost them popular support. Parliament was dissolved; the merchants could not long forbear to trade; and the king continued to collect the customs levies. In 1635-1636, under the inspiration of Lord Treasurer Weston, the early Stuart schedules of duties were extended by the authorization of the collection of the "new increases of new impositions" upon general merchandise and wines and of a new imposition of three pence upon aliens. Two years later a new imposition was placed on lead exported, and another, the new impost of 1638, was levied upon wine.

In 1640 the general customs brought in £172,500; the petty customs £72,500; the tobacco duties £11,000, and the sea-coal duties £11,000. In addition the Crown received £141,285 from the impositions of 1608 and their extensions of 1622, and £36,512 from the praetermitted customs.

Since the "certainty" of revenue was almost as highly regarded as its volume, the early Stuarts continued the practice, already in vogue in Elizabeth's time, of "farming" the customs duties. Syndicates of financiers contracted to pay to the Crown certain sums for the privilege of collecting the various classifications of duties. In some cases they made enormous profits, but such was the zeal of the Crown officials for money that extremely sharp bargains were driven. Heavy initial bonuses or "fines" and administrative expenses cut deeply into possible profits and rendered necessary the strictest enforcement of the various customs statutes by the farmers if they wished to show a favorable balance sheet. Virtually all the great merchants and financiers of the time are to be found as members of the farming syndicates. Often bitter

hostility developed between rival groups which were bidding for the same farms. It is possible that the enmity thus engendered contributed to the constitutional disputes of the period. By way of comparison with the past era, the sums of money involved in some of the contracts were very large indeed; and in many years the fiscal operations connected with the great farm of the customs represented the largest financial transactions of the time. In the three years, 1640, 1641, and 1642, the syndicate which farmed the great customs paid at the Exchequer over £560,000 in rents, fines, and loans in anticipation of future collections.

The customs and land rents did not provide nearly enough income to meet the steadily rising expenses of the government. Scarcely a month went by but serious consideration was given to some new scheme to bring in additional funds. At one time great hopes were entertained of a plan to sell the honor of being made a baronet for £1,080, one-third cash down and the balance in instalments. Catholics who refused to attend the Anglican church were fined for their recusancy, and thus fiscal advantage was served by public policy. Old penal statutes were enforced. On occasion, forced loans and benevolences were exacted, until the Petition of Right in 1628 put an end to such levies. During the 1630's it was discovered that the seacoast towns and counties were responsible for the maintenance of ships for the king's navy; and before very long the same obligation was laid upon the inland counties on the ground that since they benefited from the navy, they too ought to contribute to its support. The levies of ship-money were perhaps the most successful fiscal invention of the early Stuart treasury officials. Between 1632 and 1642 ship-money yielded £742,000; but since all the money collected was actually used for the purpose specified in the king's writs, the treasury found in it no relief from its ordinary needs. During the 1630's also there was much interest in the introduction of an excise tax laid on articles of consumption. Fear of popular opposition and the absence of forts and garrisons over the country to intimidate the people led to the rejection of the proposal at this time. In 1638 what amounted to an excise of 40s. per tun was laid on wines. By another type of indirection excises were laid on soap in the form of royalties paid by monopolists. Yet no general or open excise was laid in these years.

The calling of the Long Parliament and the outbreak of hostili-

ties between Charles I and the parliamentarians were in part the expression of the breakdown of the system of royal finance which had been instituted by Henry VII. Stripped of resources by the attempt to suppress a revolt of his Scottish subjects and unable to meet an indemnity which mounted each day that the Scottish army in occupation of northern England had to wait for payment, Charles I had no recourse but to call a Parliament to obtain funds. Among those who became members of the assembly there were some who intended to use the king's necessity to force him to relinquish the control of the state into their hands. Others hoped to end for once and all the continued demands upon their purses in the form of ship-money levies, monopolies, and other royal "exactions." When the hard-pressed king would yield no more of his prerogatives, civil war ensued. In its course those eager for political power took over completely the government of the state. Those who fondly hoped for the "end of payments" were bitterly deceived. Payments not only did not cease; they became more onerous than ever.

Increases in Government Expenditures

The expenses of the government under the Commonwealth and Protectorate mounted steadily to such heights that we may well date a new era in public finance from the execution of Charles I. Nor was there ever a recession to the figures which men of 1640 thought so cruelly burdensome. During the second half of the seventeenth century the volume of English government expenditures was on a new scale of magnitude which justly entitles us to call them modern. Thus, for example, in the year 1657 the expenditures of the various treasurers were £2,878,174.

The "Monthly Assessments," direct taxes assessed in specific sums each month upon each county, yielded on the average £500,000 yearly between 1654 and 1660. The customs produced over £300,000 a year at the Exchequer, during the 1650's, and the actual collections were even larger. Excise taxes were introduced by the parliamentary government, and on the excise account during the years 1655-1656 and 1656-1657 the public paid taxes of over £500,000 in each year. Expenses and allowances reduced the actual receipts from the excises as paid at the Exchequer to about £350,000. Much was raised from fines of royalists, sales

of Crown and church lands, and loans; but still the Protectorate was deeply in debt at the time of Cromwell's death. The charges of the army and of the navy absorbed by far the largest part of the Commonwealth income. By the end of the seventeenth century the national budget ranged in the vicinity of five and one-half million pounds.

It is not necessary to discuss the bungling attempts made by Parliament to set up a new system of public finance to replace the Tudor-Stuart organization which it destroyed so vindictively in the spring of 1641. Though the customs farmers were fined £150,000 and deprived of their contracts for collecting customs duties on the ground that the existing customs had not been authorized by Parliament, customs duties were continued. In theoretical discussions customs duties were not only justified but exalted as the ideal form of taxation. They were regarded as levies on the consumption of luxuries or superfluities and were considered as meeting in perfect fashion the newer view that taxes should be gauged by men's ability in expenditure.

Monthly Assessments and Excises

Much more important were the efforts of the revolutionary governments of the period to find a substitute for the fifteenths and tenths and the Tudor subsidies. In rather bold fashion, the fiscal agents of the Long Parliament determined upon the sum which they needed and then levied or assessed proportionate parts thereof upon the counties in the form of assessments to be paid monthly or weekly, using the Stuart forced loans and the ship-money taxes as the basis for the assignments. The amounts assessed on the different counties were to be collected by the county authorities in the form of an income tax. Actually the intention of Parliament was negated by the loopholes in the statutes and by the exemptions allowed by the local authorities; and the monthly assessments developed into a land tax, which remained an important feature in English public finance all through the eighteenth century.

Finally a most significant new departure was made in the introduction of excise taxes. In 1643 Pym proposed in the Long Parliament "another way for the speedie raising of money" by laying an excise on commodities bought and sold. A contemporary de-

clared that such a proposal made two years earlier would have been considered as tending to the ruin of the kingdom. After much opposition Pym's proposal was accepted, and an excise duty was laid on beer, ale, cider, and perry. A few months later soap, cloth, and spirits were added to the list of dutiable articles. The duties on beer, to give but one example of the amount of the new tax, were 2s. per barrel of strong beer priced at first over 8s., and later, over 6s. In 1644 the excise was extended to salt and flesh meat.

In spite of opposition and even riots against the new excises, they were continued, and it was not long before theoretical justifications for them were forthcoming. Tumults against the collection of the excises in 1647 led to a statement by the Parliament that nothing could have drawn the Lords and Commons to resolve upon this imposition but the preservation of religion, law, and liberty from utter ruin and destruction. It was the only means available, it was said, to draw in malignants and neutrals to bear their proportionable parts of the charge; its continuance was required to pay debts and permit the settlement of the kingdom. When these objects were by God's mercy accomplished, they would then make it appear how much more ready the Parliament was to ease the people of this charge than it had been willing at first to impose it.

Public Finance After the Restoration

Needless to say, the excise was never removed even after religion, law, and liberty had been saved from ruin by the execution of Charles I. Rather, the excise taxes continued to be necessary sources of revenue, and their collection was continued. Fiscal officials approved of excises because they were easy to collect, being levied upon a comparatively small number of producers or traders, who passed them on to the ultimate consumer in the price of the articles. Excises were, in addition, "sure." By this it was meant that their yield would probably not diminish with time as had been the case with the old fifteenths and tenths, but rather would increase with the growth of consumption. Finally, it was believed that excises were paid by most men, except perhaps in the case of misers and hoarders, according to their means,

since what a man "dispended" was a good test of his ability to pay taxes.

At the time of the Restoration of Charles II the chief source of excise revenues, the tax on beer, was continued, together with the tax on spirits. The other duties under this head were repealed. In 1662 a new excise duty was levied. This was the Hearth Tax, at the rate of two shillings per hearth per annum, with exemption for the poor. The Beer Excise and the Hearth Tax constituted a regular feature of the revenue of Charles II and his brother James. After the Revolution of 1688, although the Hearth Tax was repealed, excises were greatly extended to include salt, legal deeds, hackney coaches, glass, windows in houses, malt, leather, coal, candles, hops, and other commodities.

The Restoration government of Charles II profited greatly both from the break with the Tudor-Stuart fiscal system and from the innovations which were effected by the governments of the Protectorate and the Commonwealth. It was still asserted that the king must live of his own; but that ancient shibboleth was modified by the recognition in principle of the obligation of Parliament to provide him with enough to live on. In actual practice the sum of £1,200,000 per annum which was granted to Charles was never collected in full. Charles II was often financially embarrassed to the point of accepting subsidies from his cousin, Louis XIV of France, to keep England in line with French policy. With the Revolution of 1688 and the beginning of the war with France men still mouthed their ancient creed, but admitted that the fighting forces were outside the scope of the king's responsibility. Parliament's assumption of the charge for the army and navy marks the completion of the fiscal revolution which began with the failures of 1640-1641. The details of this development will be considered in a later chapter.

Concurrently with Parliament's recognition of its responsibility for supporting the fighting forces of the nation came the greatest discovery in public finance of the last years of the seventeenth century. This was the realization that public expenditures need not be limited to income from revenue, but that revenue could be used as the means of paying *interest and amortization charges on borrowed funds*. Thus a revenue of £1,000 a year might be made to furnish an immediate sum of £10,000, provided that the revenue in question were earmarked as a fund to meet the pay-

ment of interest and principal over a number of years. The idea was successfully applied in a number of cases during the decade after 1690. Examples in connection with the loans advanced by the Bank of England and by the East India Company have already been cited. The details of the most successful management of public loans were not worked out, however, until after the opening of the eighteenth century.

Elizabeth enjoyed a revenue of perhaps £500,000 net a year during the last few years of her reign. This increased to a certain extent during the reigns of James I and Charles I, though the receipts of the Crown frequently fell far below the maximum sums collected by Elizabeth. In 1641 it was estimated that the Crown income was about £862,000. The heavy expenditures for the army and navy by the Commonwealth involved entirely new concepts of public finance. From the death of Charles I to the Restoration the costs of the army ran from £1,200,000 to £2,000,000 annually, and those of the navy mounted to as much as £900,000 and more a year. By 1651 "the public expenses" amounted to £2,750,000 or thrice the total revenue of Charles I in his most prosperous years. During the reign of Charles II the normal revenues were around £1,200,000 annually, with an upward tendency to over £2,000,000 a year during the reign of James II. England's participation in the great wars with France after 1692 raised expenditures very sharply. In the single year 1694 (Michaelmas 1693-Michaelmas 1694) the Crown collected and expended approximately £6,000,000. This amount was repeated in succeeding years down to the end of the century. All these figures taken together show that within less than a hundred years the English people were in a position to increase their contributions directly and indirectly to the support of their government by over 1000 per cent.

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NATIONAL POLICY IN REGARD TO ECONOMIC LIFE

As THE sixteenth century ended and the seventeenth century began, there were many farmers, artisans, manufacturers, and merchants who conducted their businesses along the lines best calculated to make the largest profits for themselves without very much regard for national control or social regulation. Yet the number of those who would have admitted the desirability of this kind of uncontrolled and unsupervised activity was probably very small. It was still generally believed that it was a good thing for somebody to inspect goods to keep up their quality in the interests of the consumer, and for somebody to check frauds in manufacturing lest the foreign customers cease buying English goods, and for somebody to keep labor in its place, and above all, to encourage commerce and trade by grants of monopolistic privileges. The Stuarts inherited the ideal of the well-ordered society from the Tudors, and both James I and Charles I worked at the task of adapting the agencies of social control to seventeenth-century conditions. How were they to deal with the fact that much industry had escaped guild control by moving outside the boundaries of the towns? What kind of farm relief could legitimately be given? Above all, on what justifications could the Crown rely to garner in the funds necessary to support the agencies of the state?

Inasmuch as the first part of the seventeenth century was, in general, a period of agricultural prosperity there was less insistence than there had been at various times during the sixteenth century on farm relief. The best boon that the embattled farmers could ask for was that the government should abandon its opposition to enclosures and recognize the right of the farmers and landlords

to make the maximum profits from their land with a minimum of government interference. Distress among the underlying agricultural classes caused riots in Leicestershire, Warwickshire, and Northamptonshire in 1607, and these were followed by a survey, in the traditional form, of "depopulation." The inquiry, as usual, was unsuccessful in turning back the clock, but much of our knowledge of the progress of the enclosure movement during the early seventeenth century is derived from the "returns" of the commissioners. Some years later (in 1619) King James I came to the conclusion that laws against enclosure involving the conversion of arable to tillage were quite unnecessary and that they were sometimes made the basis for malicious prosecutions. In his proclamation he declared that the laws touching the converting and turning of tillable lands into pasture and using the same in pasture were rather of late become a means to molest some innocent subjects. Moreover, he felt that if the price of corn should rise, which would happen if there were any scarcity of grain, vast areas of land would be brought into arable culture. He held that the extension of pasture farming was desirable because it would increase the supply and bring down the price of beef and mutton. Though there were later efforts to check or regulate enclosure, this proclamation may be regarded as the end of any serious attempt to check the movement of seeking the most profitable uses of the land.

The apprenticeship clauses of the statute of laborers, insofar as they were meant to provide an adequate supply of laborers in agriculture, seem never to have been enforced, and certainly they were inoperative during the seventeenth century. The assessment of wages continued to be made by the justices of the peace during the opening years of the seventeenth century, but the number of assessments declined rapidly between 1610 and 1620. After 1620 they almost ceased to be made, except in certain years such as the periods 1630 to 1634, 1648 to 1654, and 1680 to 1684. It is possible that with good times for farming there was less worry about agricultural wages.

During the Civil Wars and the period of the Commonwealth and Protectorate farm prosperity suffered a considerable setback. When the landed classes resumed control of the government of the country with the Restoration, their notions of the needs of agriculture were far different from those which had been advanced

in 1485. Instead of relying on wage assessments to provide a cheap labor supply, the gentry in the House of Commons adopted the Act of Settlement. They sloughed off feudal burdens and substituted for them an excise tax paid by the entire population. In place of licenses to export their grain, they adopted the policy of the government's payment to the farmer of a bounty on the export of grain when domestic prices fell below a certain level. For the next century national agricultural policy was shaped in these terms.

The same sort of transition from the old to the new, the gradual abandonment of one policy and the introduction of another, is to be found in the Stuart program of industrial and commercial control. The Stuarts, no less than the Tudors, had the feeling that trade and manufacturing could not be left to their own devices, but must be regulated in the interest of the nation as a whole. In such regulation the maintenance of quality was the prime consideration. There was no particular concern with working conditions, hours of labor, amount of profits, or other matters which were to become significant in later times. This sort of industrial policy was an inheritance from the sixteenth century. Yet its force must have been weakened by the fact that many of the older agencies of social control had ceased to function. The guilds, for example, no longer played an important part in industrial regulation, because so much of the manufacturing of that time was done outside the cities. The officials by whom the Tudors had implemented the work of the guilds, such as the clerks of the market, the aulnagers of the new drapery, and the sealers of tin, continued to be used by the Stuarts, and indeed the operation of such officers was extended during the period before the Civil Wars. Thus in 1605 the Duke of Lennox was appointed aulnager of the new drapery, and in his patent many types of cloth, newly introduced, were made subject to his inspection. In 1616 James I appointed a surveyor of coal, and three years later a surveyor of lead to remedy the abuses in smelting lead which had caused great disgrace to the lead of this realm in foreign parts. In 1637 Charles I appointed a surveyor of iron, and in 1639 all silks made in London were ordered to be viewed and registered at a royal office, both before and after they had been dyed, since "no search was sufficient to detect the mischief" of false dyeing.

During the later years of Elizabeth's reign a number of medieval guilds were reorganized to carry out national industrial policies, particularly those connected with the enforcement of the seven-year apprenticeship. Such guilds differed from those of the Middle Ages in that they were composed of capitalist masters and that their powers were derived from the Crown or from Parliament and not from the municipalities. Thus all caps made in London were subject to inspection by the Haberdashers and all leather goods made within three miles of the city were under the supervision of the Companies of Curriers, Saddlers, and Shoemakers. Such companies had great difficulty in exercising any real control over the trades in which they were formed, although they did keep records of apprenticeship and made some efforts to maintain and even to improve quality. They were in some instances so zealous in protecting the artisans of their respective towns from the competition of outsiders and the intrusion of aliens that it has been suggested that the maintenance of the local wage scale, the control of the labor market by the local workers, and the exclusion of foreign workers with their superior skills were the main causes of their existence.

The Stuarts continued to use various guild companies both in London and in the provincial towns to carry out their trade policies, especially in the case of older established industries, in so far as they were conducted in the towns. The tendency toward the control of the individual guilds by the richer masters, already evident in the sixteenth century, developed still further. As a reaction from this sort of oligarchic control, the smaller masters in full standing occasionally sought to use democratic measures to recover for themselves some part in the election of officers and in the direction of guild policy. Instances of this sort were particularly frequent in the London guilds, such as the goldsmiths, the pewterers, and others during the period of the Civil Wars and the Interregnum.

In the yeoman organizations, formed during the fifteenth and sixteenth centuries as subordinate parts of the greater guilds to comprise the journeymen and the masters who worked on orders placed with them by the richer traders, the working masters had become industrial capitalists employing considerable numbers of journeymen. Many of these were little more than skilled employees, with no chance of ever becoming independent producers.

In these yeomen organizations control was taken over by the industrial employers. The smaller masters sought to escape from their domination by seeking incorporation as new and separate guilds, and under the early Stuart rulers a number of new guilds of small masters were formed. Thus the Feltmakers' Company comprised the small masters of the guild of haberdashers. The apothecaries separated from the Grocers' Company, and the glovers, from the leathersellers. After the beginning of the Civil Wars this sort of new incorporation was abandoned, and the less important workers—journeymen and apprentices—sought by weight of numbers to assert their right to a voice in their guild policies. With the failure of this program the journeymen, now reduced often to the status of permanent laborers, began to be interested in various forms of secret societies outside the guild structure altogether. In these associations the trade union of the eighteenth century may be considered as having originated.

A Stuart departure which carried to their conclusion certain guild powers and privileges was the incorporation of groups of producers into new companies entrusted not merely with rights of supervision, but with a monopoly of production or of sale. Such corporations were the Starch Company, justified because a corporation would prevent the waste of good wheat in the manufacture of a new-fangled luxury, and the various soap companies of Charles I's reign.

The supervision and control of the quality of industrial products was already moribund when the seventeenth century began. It is obvious, therefore, that there must have been something more than the mere force of inertia to keep the system going. An explanation of the problem is afforded by a closer study of the interrelation between the grant of powers of supervision and of industrial monopoly, the schemes and intrigues of projectors, and the fiscal requirements of the Crown. In many cases where new powers of inspection were introduced by the Stuarts, or where companies were set up either to supervise quality or to monopolize the production or distribution, some enterprising projector had "proved" that the scheme would both benefit the public and provide for the financial needs of the Crown. Yet it should be noted that the later trade union development owed much more to eighteenth- and nineteenth-century conditions than they did to seventeenth-century organizations of journeymen.

Monopolies Under the Stuarts

During the Tudor period many men had made the pregnant discovery that if they pooled their resources with those of others, purchased improved equipment, hired trained technicians and skilled workmen, they could make large profits in undertakings which individuals with their own limited means could not undertake. The spirit of enterprise here at work was often shunted off into treasure-seeking ventures or into piratical expeditions intended to relieve the king of Spain of his wealth; but, as has been noted, more substantial projects were also taken in hand.

With the opening of the seventeenth century, projects were the order of the day. All sorts of people sought to get rich by starting large-scale enterprises, many of which can scarcely have seemed sound even to those who devised them. In line with the current tradition, the projectors frequently sought to make assurance of huge profits doubly sure by seeking a monopoly of their field from the Crown. Men of vision and daring frequently tried to assure a friendly attitude on the part of the government by the inclusion in the petition for a monopoly of an arrangement for the division of the profits with the Crown. In 1609 Sir Julius Caesar, then Chancellor of the Exchequer, made a list of 109 schemes of this sort which had been brought to his attention.

The popular dislike of monopolies had already been shown in Elizabeth's reign. After public opinion had been clearly revealed in the debates in the Commons in 1601, Elizabeth had revoked a few of the most objectionable monopolies. Immediately after his accession James I issued a proclamation recalling all patents to individuals then in force; but grants to corporations were continued, on the ground of the attorney-general's opinion that they were not monopolies because they were enjoyed by more than one person. Before long, as various projects were presented to the government, James proceeded to issue new grants of monopolies in considerable numbers. His policy was subject to criticism, but those who protested most seriously seem to have objected less to monopolies than to the fact that they themselves did not participate in them. The Parliament of 1606 discussed some twenty patents of royal creation but at the same time confirmed certain patents by its own authority.

During the decade from 1610 to 1620 the king was forced to have recourse to various fiscal expedients because of Parliament's refusal to vote further taxes. Numerous monopolies were issued, partly to satisfy favorites and to stop their raids on the Exchequer, and partly to secure revenue by royal participation in the anticipated profits of various projects. Of these one of the most foolish was a scheme set going in 1614 to take from the Merchant Adventurers their rights to export unfinished woolen cloth to the Netherlands, and to give to a new company the exclusive right to export cloth, which was to be completely finished and dyed. It was estimated that the export of entirely finished cloth in place of the undressed and undyed gray goods which had previously formed the staples of English exports would bring in an additional profit of from £600,000 to £700,000 a year to those engaged in the cloth trade. Of this the king was to have £300,000 a year for his grant of the franchise to the new company. The Dutch, who had developed a considerable dyeing and finishing industry of their own, refused the English finished cloth, and the new company came to a quick end. Yet before the Merchant Adventurers could recover their old rights, which they did at a cost of between £60,000 and £70,000 in bribes to James' officials, the entire cloth trade had been disorganized, trade was brought to a standstill, and the Dutch began to weave their own cloth. As late as 1620 the English merchants were exporting only half as much cloth as they had sent abroad in 1613.

The Cockayne Scheme, as the project for forcing the Dutch to take English finished cloth was called, probably contributed a little to the trade depression and the hard times which struck England in 1620. The great war which was being waged in Europe was certainly more responsible; but when the amateur economists of the House of Commons turned to discuss the public grievances in 1621, they paid particular attention to the monopolies as the cause of their miseries. Three years later, in 1624, the Statute of Monopolies forbade the issuance by the king of patents of monopoly to individuals, except in the case of those introducing new inventions. Grants to corporations were still permitted on the ground that a grant to a group could not be a monopoly.

Later monopoly grants therefore took the form of patents for new inventions, which of course still continue to be issued, and

of grants to corporations. During the 1630's, another decade during which Parliament did not vote any taxes, the Crown made many monopolistic grants, with provision for shares in the profits. Exclusive rights to manufacture or deal in many articles were granted to various syndicates. The grants of the time include the sole making of glasses, the manufacture of sword blades, the sole making of newly devised axle-trees of metal for coaches, the sole making of beaver hats, the manufacture of castile soap, the making of playing cards, the sole making of stone pots, the sole making of stuffs for repelling water and rain, the control of a new engine to pump out mines, the making of tobacco pipes, the making of iron chains to moor ships, the casting of iron pots and chimney backs, the sole compounding of saffron, and of white and red lead, the sole gilding of cabinets, and many others. Of these the only ones which brought profits of any consequence to the Crown were the grants to the soapmakers of London and Bristol; but since these resulted in increases in the price of soap, they were bitterly opposed by the wool dealers, who were large users of soap for washing wool. Other monopolies merely injured the consumers and certain vested interests without yielding any profits to the Exchequer. Such were the salt monopoly, which cut into the profits of the Greenland Company by raising the price of salt which it used in large quantities for curing the fish caught in northern waters, and the monopoly of the sale of licenses to retail tobacco, which was believed to injure the Bermuda Company.

The grant of monopolies has been defended as having provided a quasi-excise tax for the king while Parliament was still unwilling to levy an excise. Yet if this is so, it was an inefficient arrangement which cost the consumer at least three or four pounds for every pound that came to the Exchequer.

Anti-monopolistic Sentiment

The whole problem of monopolies again came up for consideration in the Long Parliament after 1640. The spirit of the two decades from 1640 to 1660 was anti-monopolistic, and the virtual abolition of monopolies was the most successful development which took place during the period. In November, 1640, after the appearance of a crop of pamphlets denouncing monopo-

lies and monopolists in the most vigorous and picturesque terms, a series of petitions was introduced into Parliament by certain merchants who alleged that they had been injured by the exactions of the monopolists. The Coopers' Company asserted that they had formerly sold wine at wholesale, but a recent monopoly of the Vintners' Company left them with £40,000 worth of unsold and unsalable wine on hand. The grocers complained because they could no longer deal in tobacco without paying license fees to the patentees for licensing the sale of tobacco. The London silkmen objected to a patent granted to Sir William, Middleton and others for marking silk, and the Leathersellers' Company protested that a tax imposed on exported leather as the result of a patent granted to Sir Thomas Glover was harming their trade. The feltmakers denounced the patent of the Beavermakers' Company, and the wiredrawers complained of that of the new company of pinmakers.

The members of the House of Commons needed no great incentive to denounce the monopolists, of whom, as the list given above shows, there were various categories. Yet no general act abolishing monopolies was passed. Monopolists were forbidden to sit as members of the House, a Committee of Monopolies was appointed to consider the cases of various objectionable grants, and certain monopolies were condemned. While a lot of time was spent on grants of trifling significance, such as the patent for making and selling beads and bugles, most attention was concentrated on the monopolies of soap and wine. For the past six years the older company of London soapmakers and the newer Westminster Company had been outbidding each other for the grant of a monopoly of making soap. The London soapmakers were not opposed to a monopoly; they merely wished to possess it themselves, and they were successful in securing parliamentary assistance in their contest with the Westminster Company. There were independent soapmakers who thought that the London Company was as bad as the Westminster Company, since any monopoly was objectionable to them. In spite of some support in Parliament, the independent soapmakers were unable to have the monopoly of the London Company set aside; and, partly perhaps because it assisted the government by collecting an excise on soap, the London Company continued to enjoy its rights until after the Restoration.

The wine monopoly consisted of the exclusive right, granted to the vintners, to import wine in return for the payment of an impost of 40s. per tun, coupled with the management of the sale, for the king's benefit, of the licenses to sell wine at retail. These patents were brought to the attention of Parliament by certain vintners, who alleged that all benefits of the grant were being monopolized by Alderman Abell and a little syndicate who agreed to advance certain sums to the Crown in anticipation of the collection of the impost. Parliament decided that since the impost of 40s. per tun was itself illegal and therefore a grievance, the patent should be set aside. At this time the patents for glass, alum, and salt, which had not only assisted in the development in England of new industries but had brought financial assistance to the Crown, were condemned. The glass patent, after passing through many hands, came into the control of Robert Mansell in 1615. In 1640 he had three furnaces, which cost £4,000 to equip. In 1642 Mansell was ordered to surrender his grant. The alum patent was called in in 1648, and the salt monopoly was also rescinded. As a result, so it was said, the price of salt dropped to half.

As is shown by the treatment accorded to the London soap-makers, not all monopolies were ended during the period of the Long Parliament, Commonwealth, and Protectorate. Patents for new inventions were allowed to continue; those to individuals in good favor with the republicans might be allowed to stand; and the monopolies of the great trading companies, the East India Company and the Merchant Adventurers, remained in being. In the case of the Merchant Adventurers there was denunciation enough of them and their methods, but their loans to the republican government at critical times were too valuable to allow even the most cogent arguments in favor of free trade to prevail.

The East India Company's privileges had been infringed by Charles I when he permitted a group of interlopers to organize themselves as a second India company, known as Courten's Association. The old company succeeded in persuading the Commonwealth government in 1650 to join the two companies into one joint stock, and seven years later the Lord Protector refused to open the India trade to a new group of free traders. The Levant Company and the Greenland Company were almost equally

successful in resisting the encroachments of those who held that all trade should be open and free to all Englishmen.

With the beginning of the Civil War the attempt of the state to supervise quality along the old lines was virtually abandoned, except perhaps in the manufacture of cloth. Here a certain amount of inspection was continued in order to keep up the standards demanded in foreign markets.

Although there was a good deal of "free trade" sentiment expressed in pamphlets after 1640, and though Parliament virtually ended the policy of granting monopolies, there was no general inclination, either in Parliament or out of it, to allow commerce and industry to develop as best it could without government control, regulation, or assistance. Quite apart from the fact that the absolute cessation of governmental intervention in business would have been so revolutionary that few men of the day could have been psychologically capable of advocating it, was the ever-present pressure for the continuance of government regulation created by the widespread depression in business. In view of their past experience, men could think of no way of dealing with hard times except through governmental action.

Some scholars have attempted to find in the measures taken by the various republican governments of the period from 1642 to 1660 a definitely formulated policy of state control. One writer suggests that while the early Stuarts framed their policy with some idea of insuring to all classes of the community a certain measure of prosperity, later efforts were directed toward securing the maximum volume of production. The actual legislation seems too much a series of empiric solutions of immediate problems to make it possible to see much in the way of a carefully integrated policy behind what was done. Perhaps it would be best to say that as each particular interest made its representations for relief to Parliament, the decisions taken were those which most nearly conformed to current tradition, the existing needs, attendant circumstances, and the potentialities of long-distance official pressure.

Thus the clothing trade (the making of cloth) was particularly hard hit, first as a result of the Civil Wars and then by the subsequent foreign wars with Holland and Spain. The cries for relief from the workers, clothiers, and merchants led to the appointment of a number of committees, the gathering of evidence,

the writing of pamphlets suggesting the apparent but incorrect causes of the situation, and the application in line with these suggestions of remedies which did nothing to cure the underlying evils. When, for example, the basic difficulty was the fact that foreign nations were setting up their own woolen cloth manufacture because of the difficulty of getting the regular supplies of English cloth, it was worse than useless to pass an act assigning the blame to the false making of cloth and to set up a corporation in Norwich for the better regulation of the manufacture of worsted fabrics. It was equally pointless to prohibit the export of raw wool and woolen yarn, in the hope that the foreigner, deprived of these materials, would have to resume the purchase of English cloth.

In 1650, for the more general handling of the problem of industrial regulation, the Commonwealth government set up a standing committee for the advancement and regulation of trade. Under the terms of the Act for Advancing and Regulating Trade, the committee was to consider how trade might be distributed throughout the country so that one part of the land might not be unduly rich and another poor. They were to investigate the manufacture of all native commodities and see that they were well and truly made, and they were to investigate the constitutions and ordinances of the various companies of merchants and craftsmen, "to the end that if any of them tend to hurt the Publique, they may be laid down in such manner as Parliament shall think fit." The committee known as the Council of Trade discovered that everywhere English manufactures were falling into disrepute due to the practice of frauds and adulterations; and, strange as it may seem, their suggested remedy was often the strengthening of the existing corporations entrusted with trade management or the creation of such organizations where they did not exist.

Much as the Council of Trade may have hoped for a return of the good old days when all men made goods honestly under the control of some authorized guild or company, the unsettled character of the times in itself did much to alter the old system of regulation and to lead to less carefulness in applying it. An apprentice who enlisted in the parliamentary army could scarcely be expected to serve out his term when he came home after the wars. In 1654 the Council ordered that any who had served in the army for three years between 1642 and 1653 should be able

to set up in any trade of which he was capable, "any law or custom notwithstanding." Quite apart from these cases, there were many evasions of apprenticeship, and the Elizabethan statute of 1563 in so far as it provided for a seven-year apprenticeship was much disregarded. On the other hand, at least occasional efforts were made to continue the publication of statutory wages by the justices of the peace as provided in the same statute. Parliament enjoined the fixing of wages at London and elsewhere in 1649 and again in 1656, and there are indications that the assessments were, at least in some cases, actually made and enforced. Some of the wage assessments that were made had the motivation of a desire to bring up current wages to correspond with the higher costs of living; but it should be noted that if the justices did try to bring about some rough correspondence between wages and the rise in prices, they were determined to repress any attempt on the part of the workers to gain any undue advantages.

Tariff Protection

The fiscal needs of the Crown are the basis of the second, and more modern, aspect of Stuart industrial policy; namely, the protection of English manufactures against foreign competition in the home market. No doubt the officials of the Stuart governments had some general feeling that it was better for Englishmen to buy goods made in England than those manufactured abroad. The economic writers of the past century had expressed this view often enough to warrant us in believing that it was a generally held opinion. But little or nothing had been done to coerce the ordinary person into a patriotic support of the native producer, to give the English product a price differential over the imported article beyond that provided by the costs of freight and transport. Customs duties, as levied by Elizabeth and her predecessors, were strictly revenue measures. It is true that in certain cases aliens paid higher rates than those levied on the English trader, but the protection thus afforded was directed toward the nationality of the merchant rather than of the merchandise.

At the beginning of his reign James I began to extend the policy, already set on foot during the last years of Elizabeth's reign, of increasing the Crown income from the customs. In 1604 a new book of rates was issued. This book increased the official

valuation upon which duties were paid by about 75 per cent on the average, and it included many commodities not hitherto officially valued. In the latter part of 1604 a new duty or imposition was laid on tobacco imported; in 1605 the impost on French cloth was trebled; and in 1607 new duties were laid on Rhenish wines. With the appointment of Lord Salisbury as Lord Treasurer in 1608, impositions were laid on sugar, lead, tin, and logwood, and a few months later he authorized a general imposition equal in amount to the subsidy of 12*d.* in the pound of the value of imports and exports.

There had already been violent opposition to the new customs levies, and, in fact, a group of merchants of the Levant Company had brought a case in the Court of Exchequer to test the validity of the new exactions. The decision in the Bates case favored the Crown; but Salisbury recognized that the king's action in proclaiming the new impositions was extremely unpopular. To blunt the edge of opposition, in 1610 certain abatements and exemptions from the new levies were made. All grain and all manufactures of the kingdom which were exported, except certain kinds of cloth and pewter, were entirely freed of the new duties. It was decided to make a strong stand to keep the new imposts on imports. With this end in view a strong appeal was made to the growing nationalism of the mercantile community in a manifesto in which the Crown committed itself to a protective tariff policy. Some imports, according to the preamble of the Book of Rates of 1610, were the manufactures of other nations, by which, if they were brought in unwrought in their simple materials, "the people of our kingdom might thereby be set on work." Other imports tended rather "to superfluity than for the necessary use of our subjects or any ways for the enriching of our kingdom." If it was agreeable to the rule of nature to prefer "our own people to strangers," it was better to charge manufactures of other nations with impositions "than that the people of our own kingdom should not be set on work or the country impoverished by the importation of unprofitable and unnecessary merchandises." It might be noted that a more modern protectionism is here combined with an older fear of the importation of luxuries by which the wealth of the kingdom might be drained away to no avail.

The Stuarts also extended considerably the ancient policy of

giving the edge to the English merchant over the alien by means of preferential rates on the same kinds of goods. Thus in 1613 foreign merchants were subjected to an additional imposition of 3d. in the pound of value on goods carried by them through the custom house. In 1618, when new cloth duties were imposed, foreigners were assessed at double the amount laid upon native exporters. When the New Increases of New Impositions were laid in 1635, foreign merchants again paid an additional levy. The protective tariff features of the government's industrial policy were continued all through the period of the Civil Wars and of the Commonwealth and Protectorate, and were even strengthened during the later seventeenth and throughout the eighteenth century. In a period when the more ancient forms of governmental industrial policy which dealt with quality, apprenticeship, and wages were abandoned, a new course of industrial protection through tariff arrangements was formulated. That it accorded with the wants and requirements of the mercantile world is clear from the fact that it was maintained for over two centuries even though from the beginning certain business interests disliked it because it put the king's hand into their pockets to his own advantage.

The Navigation Acts

Closely akin to the general protective tariff schedules of the Stuart period is a special series of measures designed to advance English shipping by lessening the competition of the Dutch and other European shipowners. As far back as 1381, in the reign of Richard II, English shipowning interests secured the passage of a navigation act requiring English traders to freight their cargoes in English ships. Similar acts were passed at various times during the Tudor period, but they had never been very successful and were allowed to lapse. In the later years of Elizabeth's reign a new departure was made through the payment of a bounty of 5s. per ton for the construction of certain types of English ships.

There was thus established in the past the tradition that there was something especially important about Englishmen's owning ships. To encourage them in that laudable business they were entitled to help in some form or other. Yet during the first half of the seventeenth century less was done to translate this view into

practical politics than had been the case earlier, possibly because the proponents of England's maritime supremacy wasted their efforts in fostering a fishing company to capture the control of the herring fishery of the North Sea. After many years of agitation this company was finally chartered in 1632. It went bankrupt in 1638 after involving the Crown in a great program of naval expansion in order that the English control of the North Sea might be asserted by force if necessary.

The general notion that English shipping was worthy of special protection was now taken over by an altogether different sort of special interest, which found it a useful front behind which it might limit foreign competition. This interest was the English East India Company, which was concerned with killing the competition of the Dutch in East Indian goods in the English market. Accordingly the lawyers of the company drew up a measure which prevented any East Indian goods from being brought to England except in English ships. The act, as passed by the Parliament of the Commonwealth in 1651, was, however, couched in general terms, so that it commanded the support of all English shipowners. It had certain customs tariff features which recommended it to the government. The law was subsequently re-enacted a number of times and remained on the statute book until its eventual repeal in 1849.

The act restricted the importation into England of any goods of African, Asian, or American origin to English ships. By English ships were meant ships of England or the British colonies, of which the master and three-fourths of the crew were Englishmen. Irish ships were excluded after 1663, and Scottish ships were admitted to the benefits of the system after the Act of Union in 1707. Certain goods, known as enumerated goods, such as salt, pitch, tar, rosin, hemp, flax, raisins, figs, prunes, olive oil, grain, sugar, potash, brandy, wine, spirits, and currants, were to be brought to England in English ships or in ships of the country where the goods originated. Sugar, cotton, tobacco, indigo, ginger, and dye-woods of colonial origin were to be exported from the colony of origin only to England or to another English colony in English ships. Rice and, after 1739, sugar consigned to points in Europe south of Cape Finisterre might go directly from the colonies to the port of consignment. Certain goods paid alien customs (higher rates) if not carried in English ships, and abate-

ments from the Book of Rates were granted to goods carried in English ships only if the master and three-fourths of the crew were English. French ships were subjected to a port due of 5s. per ton in English ports. After 1663 no European manufactured goods, with slight exceptions, were to be imported into the English colonies unless they were first taken to England and were carried from England to the colonies in English ships. Drawbacks of the customs duties paid on such goods when landed in England were given when they were re-exported, so that in practice European goods were sometimes cheaper in the colonies than in England. Finally, tobacco planting in England was forbidden, because it was prejudicial to His Majesty's customs. Thus there was assured to the English colonists a better market for their tobacco.

During the second half of the seventeenth century the main interest in enforcing the Navigation Acts was concentrated on the customs features. It is not clear whether the East India Company derived from the measure the benefits which it expected. The clauses relating to colonial trade seem to have been at first disregarded. After the Revolution of 1688, however, great emphasis was placed upon the control of colonial trade, and the Navigation Acts were in a sense transformed in function to be used as the means of maintaining English supervision over colonial economic life. A recent student of the Navigation Acts speaks of them as an experiment in social engineering. But in their inception they were rather a cross between the greed of the East India Company and the fiscal needs of the government. In so far as they might have been expected to increase English shipping in general, they seem to have failed altogether of their purpose. The real significance of the acts developed when, with the decline of the commercial companies at the end of the seventeenth century, they began to be used by the Crown as the agencies for the regulation of trade. The trading companies, writes William Cunningham, "no longer served as a satisfactory medium for enforcing rules of trade, as they had done in the times of Elizabeth; the plantation trade could be controlled, without being confined to a privileged body of merchants, through the machinery of the Navigation Acts." England was made the source of imports of every sort taken into the colonies and the staple for the distribution of the more valuable American products throughout Europe.

The notion that the colonies should exist for the benefit of

England was, of course, not new. It went back to the beginning of colonization and had frequently been expressed in one form or another all through the seventeenth century. It was just when the colonies began to become valuable economically that the Navigation Acts were used to regulate their trade.

The Committees of Trade and Plantations

As commerce expanded during the seventeenth century its further growth became an object of considerable interest to the government. As early as 1622 James I appointed a commission to study the problems of the current depression in industry and commerce and to recommend remedies to the Privy Council. In 1626 Charles I created a *Commission or Committee for Trade* "to advance home commodities and to repress the ungainful importation of foreign commodities to the end that trade may be balanced to the advancement of the general profit and that in such a way a good correspondence may be held with neighbor states." Insofar as the minutes of this committee have survived, they indicate that the chief items of business were the consideration of various schemes to help Charles get additional revenues. In 1634 a committee to make laws and orders for the government of English colonies planted in foreign parts was created. In 1650, after the fall of the monarchy, the Commonwealth government set up a trade commission to "take care that government and order in trade may be preserved and confusion avoided." The problem at the moment seems to have been the maintenance of the privileges of the trading companies created by the monarchy. In 1655 Cromwell organized a permanent committee, with members from various ports to give him expert opinion on matters of economic importance. When the monarchy was restored, Charles II organized a new committee of "understanding, able persons" to take "into their particular consideration all things conducive to the due care of trade and commerce with foreign parts." Certain members were chosen from among nominees of the various commercial companies; others were privy councilors. They were to form a permanent committee to advise the council on matters of economic policy. A second committee, that of Plantations, was appointed to deal with colonial problems.

The Committee of Trade dealt with tariff questions, problems

arising out of the Navigation Acts, charges for convoy, and the export of precious metals. DeWitt, the Grand Pensionary of Holland, considered their decisions so excellent that he declared that "the English, anno 1660, settled their Rates of Customs and Convoy money so well, according to these maxims, to favor their inhabitants as much as they could and to burden all foreign Masters of Ships and Merchants" that they seriously threatened Dutch trade. The Committee of Trade was convinced, moreover, of the continued value of the chartered companies in managing foreign trade and of the importance of supervision, through charter grants, of colonizing activities in America. The continued oversight of commerce and colonization by the Crown is in sharp contrast to the virtual abandonment of supervision and its replacement by tariff protection in regard to industry and agriculture. After the Revolution the Parliament tried to take over the supervision of trade by creating a permanent Board of Trade responsible to Parliament. King William opposed the move and, during the distraction afforded by Charnock's plot against his own life, he appointed a permanent Board of Trade, responsible, as earlier committees had been, to the Privy Council.

The Relief of the Poor

There is one other element which enters into the Tudor and Stuart policy of the regulation of trade and industry which has yet to be noticed. This is the interest of the Crown in mitigating the sufferings of the poorer classes in times of dearth. In earlier centuries the towns had endeavored to supply their laboring people with food in times of scarcity at special prices. During the hard times of 1572 the Privy Council had tried to force farmers to bring grain to the market, and in the bad year of 1587 efforts were made to find out how much grain was available and to secure its sale at reasonable prices. These measures were repeated during the serious crop failures of the years between 1549 and 1597 and again in 1630-1631. At various other times, as in 1591, 1622, and 1623, instructions were issued by the council to employers to keep their workpeople employed in bad times as well as good. The legislation in behalf of the "impotent" or sick and aged poor and the vagrants was summed up in the Poor Law of 1601.

That the problem of poverty made itself felt, if only because of the relatively large numbers of those involved, is indicated by an account of the town of Sheffield in 1615. There were in the town 2207 people, of which number 725 were "not able to live without the charity of their neighbors." "These are all begging poore," says the survey; that is to say, that one-third of the inhabitants were beggars. One hundred householders relieved others. "These (though the best sorte) are but poore artificers; among them is not one which can keepe a team on his own land, and not above tenne who have grounds of their own that will keep a cow." One hundred and sixty householders were not able to give any relief to others. "These are such (though they beg not) as are not able to abide the storme of one fortnight's sickness but would be thereby driven to beggary." There were 1222 children and servants of the said 260 householders, "the greatest part of which are such as live of small wages, and are constrained to work sore to provide them necessaries."

Conditions in Sheffield were unusually bad. Yet while things were better elsewhere, there was but a small margin of comfort for many of the inhabitants. A large number of the people of England either were poor or had been reduced to beggary. It is not possible to question the sincerity of the Tudor and Stuart interest in the problem of poverty or to doubt the desire of the government to shape national policy in such a way as to help employment and to improve the general levels of well-being. Many of the specific measures adopted to help industry and commerce did, of course, operate toward the attainment of these objectives. Unfortunately, the short-range measures which dealt, not indirectly with the increase of England's wealth, trade, and employment, but directly with the relief of the conditions of labor and with the poor folk who had lost their jobs were rather narrowly conceived and harshly administered. During the first four decades of the seventeenth century the Elizabethan codes for the working classes, both while they were employed and during periods of distress, were administered with some regard for their original spirit and intention, thanks probably to the frequent supervision exercised over the local authorities by the Privy Council. With the outbreak of the Civil Wars central control ceased and the authorities of the parishes and counties adopted what seemed to them the policy of greatest advantage to them-

selves and their locality. Authoritative wage assessments became a mere formality or ceased altogether, and each parish took care of its own poor "with a primary regard to local convenience, so that there was danger of insufficient care for the needs of the poor and of scant attention to the national interest." The basic tragedy was not that industry and agriculture could not absorb the increasing population, but that the wretched state of the unemployed pauper prevented any significant rise in the wage scale. Should conditions warrant higher wages, the position was "spoiled" by the presence of large numbers of unemployed accustomed to very low standards of life and willing to work for little more than enough to satisfy their minimum needs.

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Chapter 16

THE EIGHTEENTH-CENTURY MILIEU

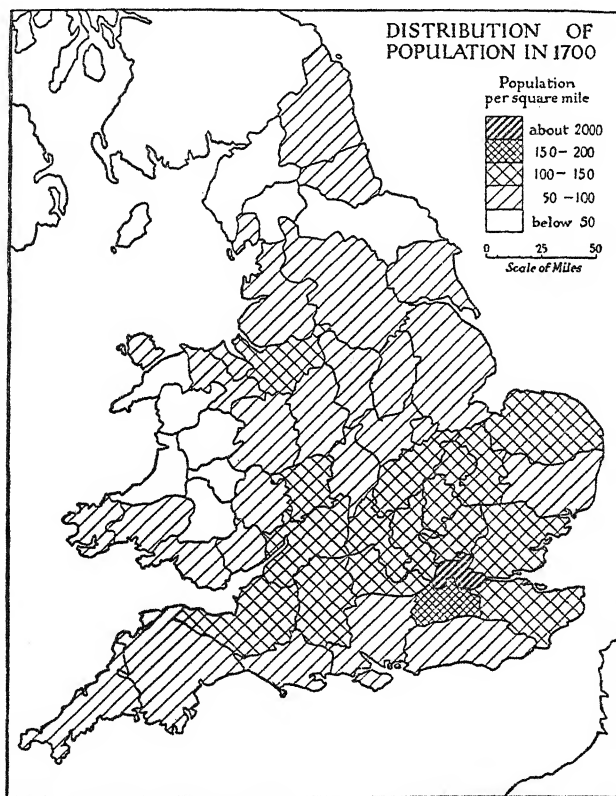
The Population of England

GREGORY KING and other economists writing in the last years of the seventeenth century estimated the population of England in 1688 and 1696 at 5,500,000 persons. Of this number those engaged in agriculture, with their families, amounted to 4,265,000; artisans and craftsmen and their dependents, 240,000. There were 50,000 seamen, 40,000 shopkeepers, 44,000 military and naval officers and men, 10,000 merchants by sea and by land, 10,000 lawyers, 10,000 clergymen, 10,000 persons in public office, 15,000 gentlemen and esquires, and 16,000 persons in the sciences and liberal arts. Between them they had an income of £43,500,000, out of which they saved over and above their expenses £1,825,000 a year. Their savings would have been larger, apparently, had it not been that among them there were 849,000 "low" persons and their families who decreased the wealth of the kingdom to the extent of £622,000 a year. The seamen, farm laborers, cottagers, paupers, and vagrants had a greater expense than they earned; consequently, they seem to have cost the nation money instead of having contributed anything to the national prosperity by their labor and effort. The strongly marked agricultural character of the population is clearly indicated by the figures which are given above, as well as the small percentage of the whole population of England engaged in industry and commerce.

More interesting than the figures themselves are King's conclusions as to future growth, already noted. At the rate of increase which then prevailed, he indicated that the population would reach

6,420,000 in 1800; 7,350,000 in 1900; 11,000,000 in the year 2300; and 22,000,000 in the year 3600.

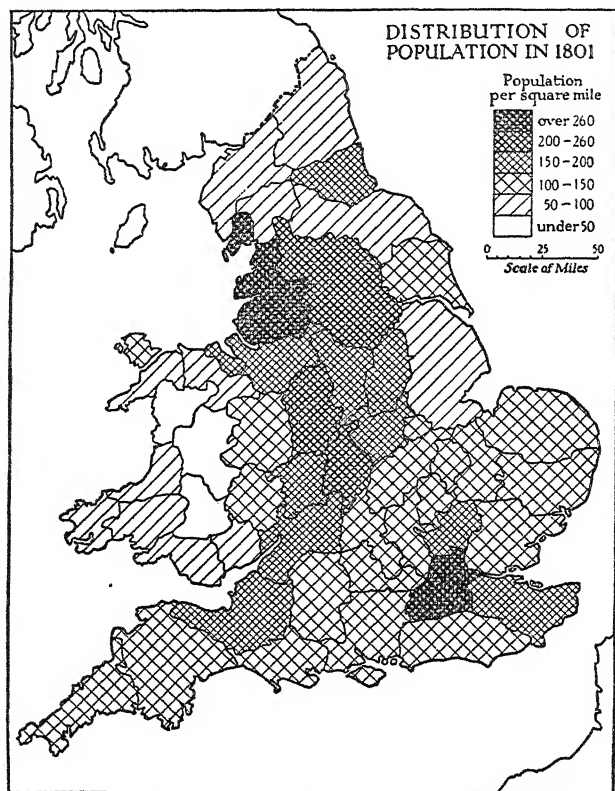
In 1770 Arthur Young made another estimate. He concluded that England had 8,500,000 inhabitants, of whom 2,800,000 were farmers, laborers, and servants in agriculture counting men and



their families; 3,000,000, manufacturers; 800,000, landlords, fishermen, and miners; 700,000, persons engaged in commerce; and 500,000, members of the civil, military, and naval establishments. The people of the nation, who actually numbered nearly 1,400,000 fewer than Young calculated, had an income of £110,500,000.

In 1801, when the first census was held, 8,872,980 persons were counted; and, allowing for omissions in the count, the actual number of people in England (including Wales) was just about 9,000,000. An estimate of the wealth and resources of the em-

pire for the year 1812, when the number of people stood at slightly over 10,000,000 persons, indicated a national income of something like £300,000,000 for England alone. In the division of the population the striking thing is that the number of manufacturers and industrial workers was now more than half the num-



ber of those engaged in agriculture, as compared with about one-twentieth in 1688 and 1696.

Some remarkable process was at work among the people of England, effecting a most rapid and unpredictable increase both in the number of people and in the amount of the national income. Incidentally, the same kind of thing was going on, as far as population was concerned, in other countries in Europe. Thus Prussia, excluding Silesia, had 2,256,000 people in 1740 and 3,910,000 in 1790. The province of Silesia numbered 1,109,000 inhabitants in

1740 and 1,793,000 in 1790. Württemberg counted 284,000 souls in 1697 and 614,000 in 1794. Electoral Saxony went from 1,300,000 to 2,000,000 heads between 1683 and 1812. Austria increased her people from 6,134,000 persons in 1754 to 7,937,000 in 1784. France, the most populous state in Europe, added four millions to her original nineteen millions between 1696-1699 and 1785-1787. Many continental states showed important population gains. In some cases the rates of increase were larger than in Great Britain; in others, the absolute growth was greater.

Factors Affecting Changes in Population

The population figures for England demand special consideration. Through careful studies by officials of the British census office of the materials available in the parish registers and other documents, there are at hand estimates of the number of people in England from decade to decade during the eighteenth century. These figures, as corrected by more recent research, run as follows.

Year	Population	Percentage Increase for the Decade
1700	5,835,000	
1710	6,012,000	3.04
1720	6,047,000	0.58
1730	6,007,000	-0.66
1740	6,012,000	0.08
1750	6,252,000	3.9
1760	6,664,000	6.6
1770	7,123,000	6.9
1780	7,580,000	6.4
1790	8,216,000	8.3
1801	9,168,000	11.5

Down to 1740 the rate of increase was exceedingly slow, and indeed during the decade 1720 to 1730 there seems to have been an actual decrease of 40,000 persons. But in the decade after 1740 a steady increase began. In the decade 1811-1821 the rate of increase was 16.39 per cent, and the population reached 12,000,000 in 1821. After that year the rate of increase fell gradually and irregularly, though the population has continued to increase in absolute numbers down to the present time.

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Eighteenth Century*

In attempting to evaluate the factors responsible for this, the most significant increase in the population of England in all her history, the first inclination is to ascribe some importance to an increase in the birth rate. Actually there was some change of this sort, particularly during the years from 1710 to 1790, when the birth rate rose from 27.5 per thousand persons living to 35.44 per thousand. On the other hand, the figure 27.5 for 1710 was exceptionally low, since it represents a fall from 31.1 in the year 1700. After 1790 the birth rate sank slowly so that it was almost exactly the same in 1830 as in 1760. Yet in spite of these changes, variations in the birth rate account for but a small part of the change in the population figures. The really significant alterations are to be found in the decrease of the death rate. From 1700 to 1730 the death rate increased from 26 to 33.4 per thousand. Then the curve turned downward, to 26.7 in 1760. After a slight rise to 28.8 in 1780, the downward curve was resumed, reaching 19.98 in 1810. The five-year period centering in 1820 had the lowest death rate of the eighteenth and early nineteenth centuries; and the figure of this period was not again equaled until 1881-1890.

It is not so much the fact that people were born into the world which accounts for the population changes of the eighteenth century as that more of those who were born survived the perils of infancy and reached adult life. In explaining this phenomenon, investigators are tempted to turn for the first causation to the advances in medical science.

Among the contributions of medical art during the century, the insistence upon the value of cleanliness, soap, water, and sunlight probably outweighed in importance all else that was accomplished. More specifically, obstetrics, hitherto entrusted to midwives without real training, became a science. Much was accomplished also by the working out of a saner regimen of caring for children, which reduced the volume of infant mortality.

In addition to general improvements in medical practice, very definite gains were made in the control of certain specific scourges. "Fever" accounted for a very high percentage of deaths when the eighteenth century opened. The old plague was less in evidence

than it had previously been; and although there was a scare in 1720 that it might return in an epidemic form, actually it made no serious reappearance in England during the eighteenth century.

Smallpox, another of the fevers, which fairly decimated the populations of whole districts in epidemic years, was first brought under some degree of control by the introduction in 1722 from India of the practice of inoculation. This was purposeful exposure to the disease in a mild form, at a time when one was in good physical condition, in order to render oneself immune for the future. Far more important was the development of "vaccination," first performed in 1796 by Dr. Edward Jenner and announced by him two years later in his *Inquiry into the Causes and Effects of the Variolae Vaccinae*. Typhus fever, another scourge of mankind now known to be spread only by the body louse, which carries the germ, yielded to the empiric discovery that scrupulous cleanliness of person, clothing, furniture, and bedding ended its ravages. This kind of cleanliness was actively promoted by the erection of "Houses of Recovery" for fever patients. These were opened at first in the new towns of the north and west of England and later in London.

Many of the good results attending the advances in medical knowledge were vitiated by deficiencies in some of the sanitary improvements which medical men favored and sponsored in the hope of bettering conditions. This is especially to be noted in connection with the water supply of the cities. Water was "laid on" during the seventeenth century in a number of English towns. Because the lack of sufficiently powerful pumps made it necessary to depend upon the force of gravity, only relatively small volumes of water were available. Very frequently a given district of a town would have water only on certain days of the week. When the supply was shut off, the elm-wood pipes would empty themselves by leaking at the joints, and surface water, percolating through a graveyard or manure pile, or seepage from a filthy sewer might leak in. When the water was again turned on the householders, all unsuspecting, would receive more diseases with their weekly supplies of water than their doctors could hope to cure.

There are other reasons too for suspecting that medical science played a less significant part in the growth of the population of England during the eighteenth century than might at first glance

be considered probable. Chief among them is the fact that the great advances, such as the control of smallpox and typhus fever, came after the number of the people was already showing an important tendency upward. Of greater significance than a little extra washing in disease-laden water, a little greater art in delivering women, or a little greater skill in surgery or diagnosis was the fact that the run of the people seem to have been more resistant to disease. It was not so much that doctors cured them when they got sick as that they lived longer without serious illnesses. The fact seems to be that the English people had greater vitality and better general well-being than they had known previously. These qualities result not from medical care but from a better way of living, conditioned by more material wealth. Better food, more clothing, more adequate housing seem to be the basic factors in the increased number of the people in England during the eighteenth century. Cotton shirts and underclothing and the end of cheap gin are important elements in the story. More abundant supplies of food, clothing, and shelter in turn are the expression of a growing control over the forces of nature. An augmentation in the yield of the farms and of the mines made possible an enhanced productivity in the workshops.

The Colonial Contribution to English Well-Being

Something more, however, than the development in England itself is to be considered in this connection. A very considerable part of the larger yield of the earth used by the English people during the eighteenth century consisted of sugar, chocolate, furs, rice, cotton, and other articles which came from the colonial areas. To these things should be added the fish of the waters off the American coast from Massachusetts to Newfoundland caught by English and colonial fishermen. These goods were made available for their consumption as the result of an elaborate set of exchanges. To get wheat, or fish, or sugar, or coal, whether the article in question was produced in England or in the colonies, the ordinary Englishman had to buy it, paying for it ultimately with the products which he himself had to offer in exchange. In many cases these products were manufactured goods.

Progress is conditioned not only by what men do, but by the goal they hope to achieve, the star on which they have pinned

their faith and hopes. Perhaps, therefore, before attempting an examination of the developments in productivity in England and in the colonies, on the farm and in the factory, something can be learned by studying somewhat closely the ideological milieu in which the changes in question took place. This matter of social policy may be even more important for the incidental and unintended reactions which it had than for its approximation to its meditated end. Later generations have called the social policy of the eighteenth century by the name of mercantilism.

Mercantilism

Mercantilism was practiced in various countries with differences of emphasis. The objectives everywhere were the maintenance of a high level of employment, industrial and commercial expansion, and the provision of an adequate food supply. In some countries a great deal of importance was attached to the restriction of imports, partly to stimulate domestic production and partly to conserve money and stocks of bullion. The encouragement of shipping by navigation acts was another mercantilist measure. At all points the emphasis was placed on national development.

England had adopted certain mercantilist practices as part of her seventeenth-century policy. During the eighteenth century mercantilist ideas continued to be accepted. There was, however, no logical application of an integrated and consciously developed system of state regulation of all phases of national economic life. Many people were ready to regulate or assist certain special industries or occupations, generally their own, and frequently they pitchforked almost indifferent statesmen into acceding to their desires. Consequently the English version of mercantilism was a series of detailed applications of the program. Each separate set of regulations represented the victory of some special pressure group. Yet all relied on the shibboleths already worn thin to justify the concessions made to them, to give a national complexion to a monopolistic privilege.

Yet underlying all the greed of special pleading, certain wider appeals were served. Most Englishmen wanted a large population. At the same time they realized that a multitude of people often meant much unemployment, which involved mounting rates or local taxes for its support. Setting the poor to work was there-

fore something in which all Englishmen were interested; and if a new grant of privileges promised increased employment, all approved of it. There was a general pride in the nation's having ships, and measures to encourage national shipping would find support. Colonies were believed to be a good thing to have, since they served the motherland.

Farm Relief

Of all the pressure groups none was more insistent or more greedy in its demand for consideration than the agricultural community—the farmers who wanted high prices and the landlords who wanted high rents. On the other hand, the consumers at large wanted plenty of cheap food. In the interference of the interests of landlords and farmers with those of the general public, the decision was largely for the agricultural classes. Food was to be plentiful, but it was to be dear. Indeed, it is possible to find it seriously argued, during the eighteenth century, that even the poorest were injured by cheap food, since it led only to sloth and debauchery on the part of the workers, who lived only to eat or, rather, to drink.

There had been legislative assistance to farming at least as early as the middle of the fifteenth century, but the eighteenth-century policy goes back to laws of 1660, 1673, and 1689. In 1660 the export and import of grain were made subject to heavy duties. At the same time the Act of Settlement (1662) gave an assured supply of labor by checking the migration of the workers from the parishes where they were born. In 1663 the export grain duties were lowered. A sliding scale of duties was adopted in 1670. In 1673 a bounty on grain exports was authorized, but it lapsed within a few years. The Revolution of 1688 was accompanied by good crops and low prices. To raise prices, export duties were removed and a bounty of 5s. per quarter of eight bushels was paid by the Exchequer upon the export of corn as long as the price did not exceed 48s. per quarter (about \$1.50 a bushel). Import duties remained high. Bounties on export and high duties on imported grain to keep prices up remained the aim of the government. The policy has been designated as "one of the worst instances of a class using the legislative power to subsidize themselves at the expense of the community." In actual fact, neither

this corn law nor the others which succeeded it were successful in keeping the price of grain up to the level envisaged as desirable in the act. Corn fell in price, as a result of increased production, all during the first three-quarters of the eighteenth century. The utmost that the act accomplished was the restriction to smaller limits of fluctuations in prices as between exceptionally good and bad harvests. More violent price changes might have discouraged expansion in agriculture. Arthur Young made this point when he wrote that "it was the singular felicity of this country to have devised a plan which accomplished the strange paradox of at once lowering the price of corn and encouraging agriculture: for if corn was scarce it was imported; while if there was a glut at home export was assisted so that great fluctuation in price was prevented." In 1773 the amount of protection given to grain was somewhat lowered. Import was permitted at low duties (6d. per quarter) when the price was over 48s. per quarter. Export was prohibited when the price of wheat was at or over 44s. per quarter. This act gave insufficient assistance to satisfy the landowners, and it was altered in 1791 so that the low duty on imports became effective only when the price was 54s. a quarter. Between 50s. and 54s. a duty of 2s. 6d. was paid, and under 50s. the amount levied was 24s. 3d. per quarter. Export was permitted without bounty when the price was under 46s. per quarter.

The agricultural interests further sought protection, and received it, against imported cattle. Thus in 1665 and 1680 absolute prohibitions were imposed upon the importation of Irish cattle, sheep, swine, meats, butter, and cheese. Irish wool was for a time virtually excluded from English markets by duties or other restrictive arrangements. Only in the middle of the eighteenth century was free importation of these products permitted.

Industrial Protection

Reduced to its simplest terms, the constant objective of the agriculturalists was for the greatest sales at the highest prices. Their treatment of their own laborers prevented these from eating any too much. The only possible outlet for the growing bulk of grain and meat was among the city and industrial populations. Agriculturists were therefore willing to extend to industry some of the same protective system which they themselves enjoyed.

High prices for food were to be supported by high profits and high earnings in manufacturing. A good many general statutes with this end in view are to be found, particularly those which sought to prevent the hated foreigner from learning the secrets of English inventions, tools, or processes. Workers were forbidden to leave the country (in acts of 1719 and 1750). The export of tools, machinery, and plans of machinery was forbidden (acts of 1774, 1781, 1782, 1785-6, 1795, repealed 1825-1841). Customs duties on manufactured goods imported were imposed to afford protection to English goods against foreign wares.

Eighteenth-century pamphlet literature is so shot through with the reiteration that the wool trade was England's greatest industry upon which her commercial prosperity rested that even a modern reader is apt to end by believing the assertion. The claim is less truth than it is justification for legislative favors in the past and ground for others to come. Judging by the variety and number of statutes extending mercantilist advantages to the woolen cloth manufacturers, they certainly succeeded "in convincing the wisdom of the nation that the safety of the commonwealth depended upon the prosperity of their particular manufacture." The export of raw wool was prohibited even during the seventeenth century. Since a smuggling trade with France developed, it was proposed in 1717 to keep a register of all wool from the moment of being shorn until its manufacture was completed. Though this suggestion was never enacted into law, a statute did prohibit the shearing of a sheep within five miles of the seashore. The export of live sheep, lest the fine English breed be raised abroad, was made a felony. Legislation provided for the compulsory wearing of English cloths. When calicoes and silks from the East became fashionable for clothing, draperies, and upholstery materials, the woolen cloth manufacturers not only organized mobs to tear clothes made of calico and silk from the backs of women when they appeared on the streets, but they appealed to the Parliament for remedial legislation. In 1701 the use in England of printed stuffs of China, Japan, and India was forbidden. In 1721 a more stringent act prohibited the buying, selling, owning, or wearing of these stuffs. When, however, in 1735 the fustian makers of Manchester protested against the extension of the act to include printed English mixtures of cotton and linen, on the ground that

fustian manufacture represented a very strong industry, Parliament specifically exempted fabrics made of cotton and linen from the law. It was not until 1774 that the manufacture of pure cotton cloth was permitted. Printing in England, incidentally, of white Indian cotton had never been prohibited provided that the product was exported. When Ireland and the American colonies gave indications of developing a cloth industry which might compete with the English cloth manufacture, the nascent trades were throttled by restrictive regulations, which were designed to prevent manufacture except for local use. Ironically enough, Irish wool was now exported to France, to be used in making cloth which competed seriously with the English product.

Other statutes were devised to protect the cloth manufacturers against their work people. Clubs or unions of work people were prohibited. Old legal protections of the worker, such as apprenticeship, were no longer enforced. The emigration of skilled artisans to other countries was forbidden. Since fraud on the part of the workers, taking the form of stealing raw materials entrusted to them, was common, extraordinary rights of inspection, search, and punishment were made available to the manufacturer.

Nothing was overlooked by the cloth trade in its search for privilege and security. Foreign markets were won and held by commercial treaties. Thus in 1703, during the war of the Spanish Succession, a treaty of alliance was made between England and Portugal. The clothing interest succeeded in inducing the Queen's government to admit them to a share of the benefits of the arrangement. An earlier exclusion of English woolen cloth from Portugal was rescinded in return for the admission of the Portuguese wines to English markets at two-thirds the duties paid by French wines. Portugal became a province of the English cloth manufacturers; England learned to drink port. In 1713, at the time of the signing of the Treaty of Utrecht, England and France arranged a commercial treaty on wise and generous lines. The cloth trade feared that if French wines (which were superior to those of Portugal) came in freely, the cloth trade with Portugal would suffer. In defeating the new commercial treaty, in which they were aided by other interests, the woolen cloth manufacturers were certain that "The preserving our looms and the rents of Great Britain was of greater consequence to the nation than gratifying our palates with French wines."

Protection to Merchants and Shipowners

It is generally held that, because of the excessive assistance given them, the woolen cloth manufacturers lost initiative and enterprise. Yet stagnation was not the inevitable result of mercantilism. A reverse tendency has already been indicated in connection with agricultural protection and is seen again in the operation of the laws by which British shipowners and merchants created their peculiar monopoly preserves. These statutes, known as the Navigation Acts, which have been described in an earlier chapter, were worked out in detail before the eighteenth century opened; and that fact may account for the relative lack of new legislation in aid of the merchants and shipowners during the eighteenth century.

The Navigation Acts worked not only to give assistance to shipowners but to encourage the building of a large merchant fleet, even then regarded as vital to England's very life. Adam Smith, himself the greatest critic of mercantilism, was ready to recognize the political value of these laws even while questioning their economic utility. Since self-defense was better than opulence, these acts of navigation were among the greatest measures, in his opinion, that the English Parliament had ever adopted. In order to build up a great merchant marine it was considered worth while for Englishmen to pay more for their freights and to render tribute to English shipowners rather than to make use of cheaper foreign ships.

The Colonies Under the System of Mercantilism

In the mercantilist scheme of things, colonies played an important part. They were to provide those markets for manufactured goods which could not be sold in Europe, paying for them with cheap raw materials which would otherwise have to be purchased from foreign nations. The idea is very well put in the preambles to the Navigation Acts, to the effect that colonies were to be dependent upon the mother country and beneficial and advantageous to her in the further employment and increase of shipping and seamen, the vent (sale) of English woollens and other manufactures and commodities, and the making of England into a staple

for colonial produce so that Englishmen might have first choice of the valuable colonial raw materials.

The colonists, especially those in the North American mainland provinces, occasionally had notions of their own in this connection. They did not like to have their great trees marked with the broad arrow as a sign that such trees were reserved for the royal navy, when they could make greater profits by cutting the wood into building lumber, shingles, and barrel staves. The colonials resented legislation which attempted to repress their cloth industry, their iron smelting and hardware manufacture, and their beaver hat industry in the interests of British enterprises. Yet colonial dissatisfaction in these matters must not be overemphasized since the British government had no effective way of enforcing many of their measures. Moreover, the colonial merchants grew rich in the trade of the empire to which they were admitted on equal terms with Englishmen, and the southern planters knew the value of their monopoly of growing tobacco.

Perhaps a more significant aspect of colonial mercantilism is to be found in the reaction of the needs and requirements of certain groups active in the colonies upon British foreign policy. The extensions of the British Empire in the eighteenth century were neither purposefully made nor achieved in a fit of absence of mind. They came about as a kind of by-product of the activity of certain companies, groups, or individuals operating in the colonies, whose views in colonial affairs were often substituted for a genuinely national interest.

The great European wars of the eighteenth century were caused by a most complex concatenation of causes, such as personal ambition, dynastic rivalries, the balance of power, and the preservation of the liberties of Europe, in which colonial questions played a relatively minor role. But England's participation in these wars was encouraged by financiers, investors, company promoters, speculators, corporation heads, and others who wanted to win privileges in certain colonial regions. The Hudson's Bay Company wanted to end the competition of the enterprising and ruthless fur traders of New France by annexing to the empire the fur-bearing areas of America. The West Country fishermen disliked the presence of Breton boats in the waters around Newfoundland. The land speculators interested in the Ohio Valley wanted to root out the French forts and French soldiers in that

country. The East India Company, jealous of French success in winning over the natives, embarked on a private war of conquest of French stations and of native territories in Bengal and other regions, almost without regard for what was going on in Europe. A group of financiers who were dazzled by the possibilities of inordinate profits in the Spanish-American slave trade took an active part in inducing Great Britain to enter the War of the Spanish Succession (1701-1713). When the concession of the Spanish slave trade monopoly, the *Asiento*, had been won by England, the company formed to exploit it, known as the South Sea Company, engaged in active political intrigue in an effort to secure the widest privileges. England's entrance as a full participant into the war of the Austrian Succession (1740-1748) four years after it had actually begun was due in part to the transfer of the *Asiento* to a French company.

Curiously enough, the interests concerned with colonial development did not always want an increase in the empire, as good mercantilist dogma seemed to demand. In fact they occasionally resisted expansion. The policy of the sugar planters, as it developed during the eighteenth century, illustrates pretty clearly that special interests were not committed to a zealous regard for mercantilist ideals. Rather, each group borrowed from the mercantilist philosophy such support for its own requirements as could be found there; but if a desirable line of action was contrary to the mercantilist view, it was pursued nevertheless. Thus the sugar interest stood for the strictest enforcement of the Navigation Acts to compel the North Atlantic colonial merchants to sell their bread and fish and to buy their molasses in the British West India islands rather than in the French islands where better prices prevailed. On the other hand, the planters demanded and finally obtained the relaxation of the Navigation Acts so that they could send sugar directly to Europe. When, during the course of the Seven Years' War (1756-1763), the British navy conquered nearly all the French West India sugar-growing islands, the British planters were alarmed lest they be kept as a permanent part of the empire. French sugar was grown more cheaply, for various reasons, than was English sugar; and if the French islands should be annexed the English planters would face ruin. Very cleverly, therefore, the lobby of the sugar planters persuaded the English people that they had to make a choice of what they might keep

out of the conquests from France and that Canada, also conquered at this time, would be a more desirable addition to the empire than the French sugar islands. "Who can tell me," said William Pitt in the House of Commons, "which I shall be hanged for not keeping, Canada or Guadeloupe?" Actually he could have kept both Canada and Guadeloupe except for the fact that it did not suit the British sugar planters to add the sugar plantations of Guadeloupe to the empire.

The Results of Mercantilism

On the whole the English employment of the mercantilist policy had very significant results, although these were often incidental and unmotivated and quite different from those that had been intended by men who pressed for the application of the various mercantilist principles. Sometimes excessive privilege smothered progress, as in the case of the woolen cloth industry. Yet this was probably not so in general. Industrial protection did assist, at the start, certain kinds of manufacturing, such as that of cotton yarn and cotton cloth, which would have been severely handicapped in free competition with older established trades in other lands. The measures in aid of agriculture did not keep up prices, but by providing a kind of cushion to prevent too rapid a fall in prices in years of very good crops, they prevented that discouragement among farmers which might have halted their interest in improvements of crops, stock, and techniques. The subordination to the needs of the motherland of the interests of the colonies, including Ireland under this head, led to serious unrest which was to be a factor in the successful revolt of the North Atlantic colonies and in the unhappy risings of the Irish against British rule. On the other hand, the mercantilist emphasis upon the value of colonial territories at least justified the annexation in Canada, India, and the West Indies of more than had been lost in America. The exploitation of the colonies which mercantilism furthered was without question one great factor in the increased wealth of eighteenth-century England. Ireland alone, through the device of the ownership of Irish land by English landlords, contributed (in the form of rents) an annual tribute which at the beginning of the century was almost equal to the estimated total

annual savings of the nation. In India the seizure of the hoards of the conquered native rulers and the East India Company's assumption of the right to levy taxes on conquered peoples many times more numerous than all the people who lived in England brought home vast fortunes which were added to the capital stock of the country. While the requirement that a large part of colonial exports must be sent only to England was doubtless vitiated by smuggling, English and Scottish merchants did reap the profits of the trade in sugar, tobacco, and slaves.

Perhaps most important of all, the constant concern with mercantilist ideas which was in evidence during the eighteenth century led to a peculiar emphasis upon the part played in national development by foreign trade and by manufacturing for export. Occasionally, writers like Daniel Defoe recognized that the home market was the most important factor in England's economic set-up. Yet in view of the ingrained tradition of the valuableness of gold and silver, it was hard to escape from the logic that a nation without mines of its own could increase its stocks of the precious metals only by importing less goods than it exported, taking the balance in specie. Foreign trade and the manufacture of goods which could be sold abroad were therefore raised to the dignity of patriotic practices. It was in the milieu of such ideas that eighteenth-century progress was made.

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Chapter 17

TRANSPORTATION AND COMMUNICATION DURING THE EIGHTEENTH CENTURY

"EVERYTHING wears the face of dispatch," wrote Henry Homer in 1760. He was reflecting on the changing tempo of English life, especially as it was illustrated by traffic on the English roads. Stagecoaches traveling five miles an hour, sixty miles a day, were already commonplace. The isolation of the different localities in England from each other was being broken down, and through the circulation of people and of goods from one part of the country to the other, England was attaining an economic unity she had hitherto not known. Moreover, when producers, whether farmers, clothmakers, coal miners, or pottery manufacturers, were enabled to send their products further afield, they entered markets where their goods had not hitherto been available and took in exchange articles which they themselves desired to have. By this process everyone benefited, working harder to produce more because he could sell more and buy more of what he wanted. The development of transportation and communication during the eighteenth century, then, is one of the most fundamental factors in English economic progress. The story will be divided into a consideration of internal communications and of ocean transport. Internal improvements will be considered under various heads, such as roads, canals, posts, and other services.

Road Transport

In earlier centuries England had been a series of economic areas centered in certain cities, such as London, Southampton,

Plymouth, and Bristol. Each area was to a considerable extent self-sufficient. London had long since reached out into the distant country to secure food and to garner in the woollen cloth which entered so largely into its export trade. A more general breakdown of the isolation of localities followed upon the use of wool from different parts of England for blending in the same yarn. In the case of mining and grazing a kind of localization was necessary in the nature of things; and as soon as the products of localized production were in demand elsewhere, intercommunication developed. By 1700 special industries were found in certain places, such as button-making at Birmingham and Wolverhampton, and pottery throwing at Burslem.

These and other places were connected by a network of various kinds of middlemen who carried their wares on packhorses and wagon trains from the manufacturing and producing areas to the consuming centers. Thus from Frome to London went a wagon train of seven wagons, each containing 140 cloths worth £14 each. Other factors sent pack trains of 50 horses, each carrying perhaps half a ton, of ground flint in tubs, coal in corves, wares in crates, and clay in panniers slung across their backs. In 1706 Haynes' *View of the Present* speaks of common carriers, who travel constantly from their counties to London, men of credit, able to give security for regular carriage. By 1750 nine regular carriers left Nottingham each week for London, Manchester, Bristol, and Birmingham.

Immense numbers of cattle, too, crowded the roads on their way to pasture and to market. Early in the century drovers brought 100,000 cattle and 75,000 sheep from Scotland, Wales, and other districts to London to be slaughtered at Smithfield. Geese and turkeys were likewise much in evidence. "Expresses" carried fish from Berwick, Lyme Regis, Workington, and Folkestone to London. Passengers traveling on horseback, in post chaises, and in coaches were more and more to be met with even before the century opened.

All people who used the roads agreed that the existing highways were bad and must be rebuilt, even though what the drover, the pack-train owner, the horseman, and the driver of a coach wanted were somewhat different types of road.

Horse-borne traffic was much more common than any other during the first half of the century. Indeed, down to 1750

wheeled traffic was very rare in many districts. It is not surprising that the first improvements in road building were suited to the needs of horses. In the middle or on the side of the highway a paved causeway from two feet to four and a half feet broad would be built. Not only was such a narrow roadway cheap, but it had the merit of leaving the rest of the road free of paving so that it might be used by cattle, sheep, geese, and turkeys. But the future was with the wheeled vehicle, and more and more the demand grew for broad, all-weather paving.

The agitation for better roads, which was voiced by writers in pamphlets and by speakers in the House of Commons, soon brought to the fore the question of responsibility for the necessary improvements. Who was to pay for the new roads? Under an old statute of 1555 the duty to repair the highways was laid upon the parishes through which they passed. Every person in the parish was obligated to provide labor and cart services of as much as six days a year. But it soon became the accepted view that the parish could not be forced to put a road into better condition than that which had prevailed in the past. The parish was obligated to keep up the roads in their former state. The new users of roads wanted a new service at the expense of the parishes, and the earliest thought of eighteenth-century good roads protagonists was that the parishes must provide the improvements. It did not at first occur to them that it was unjust to load on the parishes en route the costs of building a road used by two large terminal towns. By acts of 1766 and 1773 the House of Commons actually tried to force the parishes to carry through a new good roads program. The country gentlemen, who as the local justices of peace enforced the law, sympathized with the parishes and attempted to restrict the use of the roads by prohibiting certain types of wheeled vehicles. They tried to limit the loads to certain maxima. They specified the size of tires, insisting that the flanges on the wheels have a width of six, nine, and even nineteen inches, to prevent the wheels from cutting ruts into the road surface. They tried to fix the number of horses used to draw a vehicle. The wagon was an intruder to be kept off.

Gradually a new principle came to be accepted; namely, that the user of the road was under the obligation to pay for it. As early as the reign of Charles II a way of building a road so that the user paid for it was worked out in connection with the rebuilding

of a section of the Great North Road. Parliament authorized a group of trustees to make improvements in the public interest and to collect the costs of construction and maintenance through the levy of tolls on those who used the highway. During the eighteenth century 1100 such turnpike trusts were formed and among them they rebuilt the main roads of England with varying degrees of success. By 1820 there were 20,875 miles of turnpike roads. At the same time the parish roads were improved, especially after the labor services were commuted to a local tax or rate which could be drawn on to set the unemployed to work. Of these parish roads there were in 1820 over 100,000 miles.

Even at the end of the eighteenth century all-season roads were unusual. Towns expected to be cut off from each other during the winter months. As late as 1792 a letter contains the following, "You too well know that in winter when the cheerless season of the year invites and requires society and good fellowship, the intercourse of neighbors cannot be kept up without imminent danger to life and limb."

One of the greatest difficulties in road construction was the provision of proper metaling or surfacing. As late as 1808 a writer declared that the best of surfaces were ground to powder in four or six weeks. Much was done toward working out this and other problems by two engineers, Thomas Telford (1757-1834) and John Macadam (1756-1836). Their methods of construction, using a base of crushed stones over which a binder of finer stones was laid and compressing all by heavy rollers, are still used for the building of black-top roads today. The chief difference is that these earlier engineers did not use bitumen or pitch to hold the surface together.

On these new English turnpike roads the most characteristic vehicle was the stage coach, that new device of rapid transit which was as exciting to ride in then as a transcontinental sky pullman today. In 1749 one of these stage coaches was put into service to make the run from Birmingham to London in three days. In 1754 Warrington's Flying Coach ran from Manchester to London in four and one-half days. Five miles an hour for twelve hours a day, with frequent stops at posthouses to change horses, was at first the rule; and the coaches did not run at night or on Sundays. In 1784 Palmer, the postmaster-general, put on the mail coaches on certain runs, as from Exeter to London and from

Edinburgh to London. These mail coaches maintained a speed of ten miles an hour, went night and day, and made the journey from Edinburgh to London in forty hours. Could man ask for more?

The Canals

Yet it was soon discovered that the roads were not suitable for heavy transport. Cheap commodities like coal and potter's clay could not stand high freight charges. To provide cheaper transportation for heavy goods was the function of the canals. The improvement of navigable rivers was projected in the middle of the seventeenth century, and after 1690 a whole series of projects was launched looking toward the improvement of rivers in the Northwest of England. At the time of the South Sea speculation another group of schemes for improving inland water transportation around Liverpool and Manchester was put forward, since land carriages did great damage to the highways. Of these the most important was the Mersey and Irwell Navigation (Canal), to connect Manchester and Liverpool, which was finished in fifteen years at a cost of perhaps £14,000. In the middle of the century the demand for cheaper transport for coal in Lancashire led to plans for waterways from the mines to the towns. One such scheme provided for a canal, rather than a canalized river, to connect the mines at St. Helen's with Warrington and Liverpool. This canal was eventually completed by a joint stock company in which there were 120 shares assessed at £150 each. A second scheme called for a link between the Mersey and the Trent rivers. At one meeting 40 gentlemen and merchants subscribed £30,000 for the project.

There has been a tendency to personalize the work of building England's canals in a single hero. This man was a noble lord, the Duke of Bridgewater, who, rejected by his fiancé, sought consolation in the development of his estates. At Chat Moss, 29 miles from Manchester, he owned extensive coal deposits, but the mines could not be worked because the cost of taking the coal by road to Manchester, the nearest market, was more than the traffic would bear. The duke conceived the idea of building a canal to provide cheaper transportation. He set to work in 1759. The actual conduct of operations was left to Bridgewater's handy man,

James Brindley, a millwright who received wages of £1 1s. per week. Brindley had to work out all the problems of a canal himself, including methods of making the sides and bottom watertight. He acted as surveyor, contractor, engineer, and inventor. Most people who had never seen a canal or a canal lock laughed at Bridgewater's scheme and dubbed it "Bridgewater's Folly." This is important only because it prevented the duke from raising even so small a sum as £500 in the north. He actually had to fall back on London bankers for financial help.

When, however, the canal was opened in 1761 it proved to be so profitable that the Duke of Bridgewater began a second canal from Manchester to Liverpool. The success of the duke's canals was such that he became the proverbial type of princely benefactor. One historian has said of him that he "did perhaps more to promote the prosperity of this country than all the dukes, marquises, and earls combined who before this time had been born into the world." Within thirty years of the completion of the first Bridgewater canal there were nearly three thousand miles of "navigations" or inland waterways in England. In town after town, especially in the industrial regions, the businessmen united to form a canal company to build a canal to a neighboring municipality. Then during the early 1790's a perfect mania of canal building seized upon the nation, and in five years the south was provided with its own navigations and the northern and southern networks were connected by the Grand Junction System.

The canals were subject to many defects which grew out of the unco-ordinated way in which they were built. The companies were mostly small, building short canals between neighboring towns. The width and depth of each canal was governed by the ideas of the builders. Consequently, when through traffic began to develop, the barges were limited by the size of the smallest canal in the chain. Some canals would take a sixty-ton barge; others only one of twenty tons. No arrangements were made for through rates. Each barge paid toll to each company through whose canal it passed. When it is noted that between Birmingham and Liverpool a barge passed through the canals of six different companies, and of ten different companies between Birmingham and Hull, the inconvenience of the lack of uniformity, of unified management, and of through rates becomes evident. Nevertheless, the canals gave quicker, safer, and cheaper trans-

portation for freight than had ever been known. In 1770 a pamphlet stated that from Leeds to Liverpool a ton of freight took three weeks by land transport at a cost of £4 10s. subject to damage. Now, by canal, it was carried in three days at a cost of 16s. in perfect safety. Freight rates in general were reduced to about one-fourth their former levels, and larger quantities of merchandise could be moved.

The canals were used also by passengers, especially those colonists who were making their way from the less alert south to seek new homes in the industrial north. New towns grew up along the banks of the canals, to which the barges brought cheap food, coal, and raw materials, and from which they carried full cargoes of manufactured goods. Agriculture, too, was aided by the canals, for farm areas hitherto isolated were now brought close to good markets.

The whole development is admirably summed up in a later eighteenth-century description of Manchester. "Since that time the demand for corn and flour has been increasing to a vast amount and new sources of supply have been opened from distant parts by navigations [canals] so that monopoly or scarcity cannot be apprehended. . . . Potatoes, now a most important auxiliary to bread in the diet of all classes, are brought from various parts, especially from about Runcorn and Frodsham by the Duke of Bridgewater's canal."

The canals had other effects too. They superseded a good deal of coasting trade. They gave rise to a new kind of large-scale contractor and a new class of wandering workmen known as navigators or navvies, who were later to build the railroads. They caused the traveling merchant who carried his own goods to be superseded by the commercial traveler or traveling salesman who took orders from samples and later forwarded the goods by canal.

During the days of their great service, down to about 1830, when they began to be overwhelmed by the railroads, the canals made good profits for their builders and owners. The Duke of Bridgewater, for all the praise lavished on him by the historian, had a singularly clear idea for taking all that the traffic would bear. His legal arrangements to justify his rates, low as compared with land carriage, but high as compared with the cost of his service, are a marvel of tricky and unscrupulous ingenuity. He doubtless believed a return of 100 per cent a year justified. In 1824, one

of the best years for the canal companies, the Trent and Mersey Company paid 75 per cent, and its stock sold at £2,200 per share. The Loughborough Canal paid 197 per cent; its stock was priced at £4,600 a share. The Coventry Canal paid 44 per cent; the Oxford Canal, 32 per cent; the Staffordshire and Worcestershire, 40 per cent; the Leeds and Liverpool, 15 per cent; and the Grand Junction (built in the midst of the mania of the 1790's), only 10 per cent.

The Postal Service

The most important means of communication as distinguished from transportation in the eighteenth century was the post office. It was the ordinary means of correspondence between businessmen, doing what is today done by the telegraph, telephone, and radio as well as the postal service. The post office in its modern form in England dates from 1638 when Thomas Withering was authorized to carry letters at a fixed rate. In 1657 Cromwell put the service under the Postmaster-General. At first all letters passed through London, and rates were charged on this basis. Thus a letter going from Bristol to Exeter (eighty miles) actually went first to London and then to Exeter (three hundred miles). In 1689 by-posts or local posts were established between market towns and the nearest post towns; in 1696 cross posts were opened. Of these the most important ran up and down between the cities of western England and eliminated the necessity of carrying a letter from Liverpool to Bristol through London. In 1711 sub-post offices were opened in Edinburgh, Dublin, New York, and the West Indies. Packet services to the continent, the West Indies, and Ireland were operated. By the end of the seventeenth century there was bi-weekly service to the continent, weekly service from London to all parts of England, and daily service to Kent and the Downs. London itself had a penny post for local letters.

The post served not only for letters, but for the carriage of light goods such as laces and jewels. In 1738 the transfer of money by post was made possible by the use of Bank Post Bills. These were payable only after seven days' sight, so that they could be stopped if lost or if the mails had been robbed. The sending of patterns and samples by post was also important.

Merchants were brought into further touch with each other and with the world by the newspaper. London had had weekly newspapers since 1621. In 1702 a daily paper began to be published. By 1724 there were published in the capital 18 papers, daily and weekly. The first provincial paper was published at Norwich, in 1706. York and Leeds had newspapers in 1720; Manchester, in 1730; and Oxford, in 1740. Newspapers not only reported what had happened, but printed consular letters, essays on trade, market information, movements of ships, and, finally, advertising.

Shipping

What the canal, the road, and the coastal ship did to facilitate domestic trade was accomplished on the international scale by the progress of ocean shipping. Accurate statistical data of the actual tonnage of British shipping at the beginning of the eighteenth century and of its increase during the century are lacking. Yet something may be inferred from the entrances and clearances of ships from British ports, as given in the customs records. During the last three years of the reign of William III (1700-1702 inclusive) ships cleared outward from British ports had a yearly average tonnage of 317,328 tons, of which 273,693 tons were British ships, and 43,635 tons were foreign ships. In the three peaceful years 1749-1751 inclusive the outward tonnage averaged 661,184 tons a year. The Seven Years' War saw a recession; but beginning in 1765 a rapid rise over the 1750 figures began, which brought the tonnage of ships cleared outward from British ports to 1,924,042 tons in 1800. Of these ships 1,269,329 tons were British, and 654,713 tons were foreign. Ships in the foreign trade entering the Port of London are given as follows:

Year	Ships	Tons	Average Tonnage per Ship
1702	839	80,040	95
1751	1498	198,053	132
1794	2219	429,715	193

In 1751, 203 ships were West India sugar ships; in 1794, 433. In 1750 in the coasting trade 6396 vessels entered, with 511,680 tons burden, an average of 80 tons per ship; in 1795, 11,964 vessels, with 1,176,400 tons, an average of 98 tons per ship. It is esti-

mated that a coaster made six trips a year; the figures for the entries divided by six would give the number of ships.

From such figures it is permissible to argue that there was a considerable increase in the actual number of tons of ships engaged in British commerce during the eighteenth century and that the bulk of goods carried in foreign commerce expanded very greatly. Progress in the building of ships led to more extensive trade, and the increase of commerce in turn stimulated further shipbuilding. All sorts of reactions followed from the simple fact of more ship space. Thus the experiments in colonial settlement which had been made during the seventeenth century were often doomed to disaster, hardship, and disappointment simply because the available ships could not carry from the old world to the new supplies adequate to set up the apparatus of an European civilization there. In the eighteenth century colonies developed with astonishing rapidity. Not only the necessities, but even the bulkiest luxuries, such as fine London-made furniture, could be transported over three thousand miles of ocean.

The English contribution to shipping progress during the eighteenth century seems to have consisted chiefly in an increased number of ships and a greater volume of tonnage. Technical innovation was left to the French and the Dutch, but what improvements these leaders in ship design worked out, the British builders did not hesitate to appropriate. One writer declares that "during the whole of the eighteenth century, the majority of the improvements introduced in the forms and proportions of vessels of the Royal Navy, were copied from French prizes." What was true of the Royal Navy was true also of the merchant ships.

A typical ship of the beginning of the century was the *Mary Galley*, built in 1704, of 170 tons burden. She was nearly flush-decked and retained the primitive six-sail rig of the sixteenth century, spritsail, fore course, fore-topsail, main course, main topsail, and lateen mizzen. Despite her small burden, she made a voyage to the East Indies and back.

About such average ships less information is available than about the ships of the East India Company, whose records are carefully preserved. These East Indiamen were not typical, however. They were the largest ships of their time and were closer to warships than to ships of commerce. Yet, since the smaller, average ship tends to follow the trend in the development of the

larger ships of their day, some facts about the East India Company's vessels may be significant. Their normal size in the early years of the century was 400 tons burden. In the middle period of the century, perhaps from 1730 to 1770, all East India Company ships were built just under 500 tons. In 1773 many of those vessels were rebuilt to increase their burden to 676 tons, and larger ships of from 720 to 760 tons burden were built. Toward the end of the eighteenth century ships of 1200 tons burden were constructed. These very large ships were two-deckers, arranged very much like a warship. They had greater fullness in the bilge, for greater cargo capacity, and carried fewer and lighter guns than a warship. The East Indiamen were not designed primarily for efficiency. Comfort and luxury were also considered to be very important. Hence little improvement in the direction of speed or ease of handling was to be expected in their construction.

Another important type of British ship was the West Indiaman, which, about 1775, averaged 300 tons burden. Even more significant were the colliers, which carried coal from the Tyne to London, the ports of northern Europe, and even to the Mediterranean. Three of these colliers were purchased by the Admiralty for Captain Cook to use on his voyages of discovery from 1768 to 1780. Consequently their plans are preserved. The *Endeavour Bark*, the most famous of the three, was 366 tons burden. In none of these ships was speed a real object; and although improvements in the rigging and the sails were made during the century, these were not to come to full fruition until the nineteenth century.

It may be assumed, if the experience of the nineteenth century was a duplicate of that of the eighteenth, that with more and larger ships, freight rates went down. Consequently it was possible to bring heavy, bulky cargoes of sugar, cotton, timber, and coal to market in greater quantities as the century advanced, and, since prices could be reduced because the cost of transportation was less, these commodities could be sold to an increasing number of people. A large part of the increased subsistence materials which gave more food, shelter, and clothing to the English people during the eighteenth century was made available by ocean transport. At the same time the market for English goods in other countries was expanded by the greater ease and cheapness of shipping.

Overseas Trade in the Eighteenth Century

Notwithstanding the emphasis upon foreign and colonial trade as a factor in English prosperity during the eighteenth century, it must nevertheless be kept in mind that by modern standards the whole bulk of foreign trade was small when the century opened, and it was not very great when the century closed. According to the best figures, which it must be admitted are not very accurate, the total value of English exports in the first years of the century was about £7,000,000 a year, and the value of imports from abroad into England was around £5,000,000 a year. These figures indicate a total foreign trade of about £2 per person living in England at the time. By the end of the century, the value of exports was around £30,000,000, and of imports, £28,000,000, an average per head of £6 10s. Foreign trade increased fivefold; the average value of foreign trade per head increased over threefold. National income increased from £43,500,000 to nearly £300,000,000 (figures for 1812). If the total amount of foreign trade had been clear profit, which of course it was not, it would still bulk rather fractionally in the increased earnings and profits of Englishmen during the time under discussion.

Yet the very fact that contemporaries attached so much importance to their foreign trade makes it inadvisable to dismiss the subject as unimportant in the story of England's economic life and of the changes that took place therein. Indeed the quantities of such subsistence materials as sugar, timber, and cotton carried to England in the course of foreign and overseas trade played so significant a part in English development that the trade in these commodities alone would demand attention.

To get at the essential relation between the foreign trade of the eighteenth century and that new way of living which was developing, it is necessary to analyze the figures a little more closely. The first thing that seems evident is that trade with Germany, Holland, Spain, France, Turkey, and other European countries remained at pretty much the same values during the century. Exports and imports to and from these countries represented solid, substantial business, well established, subject only to current fluctuations, and not expanding fast enough to lead to any

substantial changes in the ways of making goods entering into commerce. On the other hand, trade between England and Ireland increased tenfold during the century; that with Jamaica, sixfold; with Maryland and Virginia, fourfold; with Pennsylvania, thirtyfold; with the American colonies taken together, sevenfold; and with India, sevenfold.

The two countries for which the figures are largest are Ireland and India. Ireland sent £285,000 worth of goods to England in 1700, and over £2,000,000 worth at the end of the century, taking slightly less goods as a rule in return. The difference represented the payments of rents to absentee English landlords. Irish trade was of growing importance, but the commodities traded in were the ordinary goods of European civilization—food, cloth, and coal. Here again no dramatic change is noted. Indian trade, monopolized by the East India Company, was even greater than that with Ireland. More than half of the exports from England to India consisted of money, since there were comparatively few things that highly civilized India wanted from Europe. The East India Company was, of course, contravening the generally accepted mercantilist philosophy in carrying perhaps a half million pounds' worth of money out of the country each year, and it had to be on the defensive constantly against those who saw in its trade a source of national weakness. It sought first to disarm criticism by exporting only foreign coins and then to fit itself into the mercantilist picture by proving that by re-exporting Indian goods to Europe it brought back into England more money each year than had been exported to India. The trade of the East India Company did more than make money for its stockholders. It acquainted Englishmen with the use of cottons, muslins, chintzes, calicoes, and silks; with tea, with chinaware (brought by the company from China), with fine furniture, and with other luxuries and refinements of life.

The North Atlantic colonies from New Hampshire to Georgia, being in a sense replicas of European civilization in the new world, purchased every kind of manufactured goods from needles to fine furniture. Even though they showed a horrid propensity to make in their own shops many of the things they needed, they still purchased much in England. Maryland, Virginia, and the Carolinas sent tobacco and rice in return for their purchases. Pennsyl-

vania and New England exported bread in barrels, fish, and barrel staves to the West Indies, which in their turn sent sugar to England.

The West Indies

The trade between Great Britain and her West Indian colonies was especially valuable. In the first place, as contemporary writers pointed out, since the plantation owners frequently resided in England, a large part of the wealth created in the plantations was brought each year to England and added directly to the national stock. "The planters also," wrote William Playfair in 1801, "and other settlers, who generally return home, bring their wealth with them. . . . Every settler in the islands almost continues to remain an Englishman, so that with Jamaica and the other islands we may be said to be carrying on an internal and not a foreign trade." By the end of the century imports into England from Jamaica were almost as valuable as those from India. The figures for exports to Jamaica are only one-third as great as those of imports from the island; and at first sight one might be inclined to think that these figures indicated that the planters were bringing home every year a profit of £1,250,000 to add to the nation's wealth.

Actually this was not quite so, inasmuch as the slaves who cultivated the plantations had to be purchased. Moreover, the food eaten by the slaves was imported from the North Atlantic colonies and was paid for partly in molasses and sugar and partly in bills on London. These were eventually paid in the form of exports of English manufactured goods to Pennsylvania, New York, and New England. Even so, the wealth brought home each year from the West India colonies was of considerable importance. English sugar planters lived on a princely scale, and by their purchases greatly stimulated certain lines of business.

Sugar as grown in the eighteenth century was really a remarkable product. It represented the yield of the most fertile soil in the world. It represented the labor of many thousands of black slaves. It also represented the exportable surplus of Pennsylvania wheat and Massachusetts fish with which the slaves were fed. All of these things, soil, human toil, and surplus food, were placed at the disposal of European peoples in the form of sugar in increasing quantities as the eighteenth century advanced. But it

must be noted that the sugar which came into England was not distributed gratis among the individual members of society. Those who wanted to add sugar to their diets had to pay for it. Since sugar generally was an addition to what was on the table rather than a substitute for something else, this means that the purchaser had to earn more to buy it. Thus another incentive was at hand for speeding up the tempo of production in many fields of work.

That the additions made to the amount of human toil placed at the service of the English people during the eighteenth century are of no mean quantity is shown by the figures for slaves imported into the British colonies. From 1680 to 1786 it has been estimated that 2,130,000 slaves were imported into the British colonies in America, an average of 20,095 per year. The high-water mark was reached in 1768 when 104,100 slaves were taken from Africa, of which 59,400 went to the English colonies and the others were distributed among the French, Dutch, Danish, and Portuguese settlements. Traders from Liverpool gradually secured a dominant position in the slave trade, with 1868 voyages between 1750 and 1776. Bristol men, with 588 vessels in the same years, held second place, while London interests were gradually eliminated. By 1804 Liverpool merchants controlled six-sevenths of the whole English trade to Africa. Many of the greatest English mercantile fortunes were built up in the slave trade.

These slaves were not acquired for nothing. They were generally purchased from native slave traders on the African coast in exchange for iron bars, brass pans, hardware, firearms from Birmingham and Sheffield, powder, bullets, tallow, tobacco pipes, linens, woolens, and East India cotton goods.

The actual value of the export of goods to Africa, to purchase slaves, was not nearly as great as that of the goods sent to Germany, or Portugal, or Holland. But the African trade was a rapidly expanding business; and moreover, the commodities used in exchange were often crude and cheap, lending themselves easily to mass production. Moreover, the African slaves carried their fancies to the West Indies and with their settlement in the plantations there developed a market for the same kind of goods in the West Indies.

The whole matter can be illustrated very well by some account

of the trade in cotton cloth. Long before the Europeans had begun their systematic rape of the blacks from their homes, the canny Arab merchants had introduced among the African tribes the use of cotton cloth manufactured in India. Various striped and printed fabrics were in particular favor, and when the English slave trader began operations, he had to carry these Indian goods to do business. The English slaver secured his supplies from the East India Company, but a slaver was nothing if not willing to make a few extra pence and soon bethought himself of substituting for the Indian fabrics some cheaper wares. At first unprinted white Indian cotton cloth began to be printed in England, and thus a considerable spur was given to calico printing. With a view to still greater cheapness, stripes and checks, woven of a mixture of cotton and linen or entirely of cotton, began to be made in England to replace the Indian fabric, and purely English goods were now supplied to the African and West Indian markets. The export of goods of this kind rose to great levels after the middle of the eighteenth century, and the demand from the exporters for supplies seems to have reacted sharply on the methods of manufacture used in England. In the last quarter of the century the African and American markets for checks and prints again fell off. It was evident after 1780 that English checks and stripes could replace Indian goods in the African trade only when Indian cottons were scarce or dear; and though English cottons of this kind continued to be made, they were of comparatively little importance. The export of prints to the plantations, on the other hand, took a turn for the better in 1780 after a slump during the American Revolution and was saved by the production of cheaper calico in England, which began a few years later when Arkwright's new yarns came into use. The cotton trade was able to counteract the contraction due to the loss of the African trade in checks and stripes by the development of a new market on the continent and at home for the heavier cotton goods known as fustians and cotton velvets, which were similar to the present-day corduroys.

In the expansion of foreign trade a heavy drive came from at least two quarters. In the first place, great manufacturers such as Mathew Boulton and Josiah Wedgwood were constantly on the alert to open new markets for their products. Wedgwood, whose work in the pottery business will be described in detail

later, pushed the sale of his fine wares all over Europe. Boulton made hardware and machinery which he sold everywhere he could find a market. In the second place, the great merchants of the eighteenth century went after new markets with great zeal. They shipped their cargoes over the seven seas and put their profits back into their business. If they found a good opening for a product such as muslin which was not being manufactured in sufficiently large quantities to meet their sales, they would advance credit to a manufacturer to enable him to enlarge his plant and increase his output. The expansion of foreign trade through the enterprise of individual manufacturers and merchants is one of the most important aspects of eighteenth-century development.

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Chapter 18

AGRICULTURE IN THE EIGHTEENTH CENTURY

AT THE opening of the eighteenth century agriculture still remained England's greatest industry; and indeed during the course of the century it made such progress that it is questionable if it did not hold that position even at the end of the century. According to Gregory King's estimate of the year 1688, there were then in England 9,000,000 acres devoted to arable or plow farming; 12,000,000 acres of pasture and meadow; 3,000,000 acres of woods and coppices; 3,000,000 acres of forests, parks, and commons; 2,000,000 acres covered by houses, churchyards, roads, rivers, and lakes; and 10,000,000 acres of heaths, moors, and barren land.

Of the 10,000,000 acres of heaths, moors, and barren land there remain in England today about 5,000,000 acres of mountain, heath, and absolutely useless ground. Since 1795 1,300,000 acres of such land have been brought under cultivation. If King's figures are in any degree correct, this equation would indicate the addition of nearly 4,000,000 acres to the cultivated area during the eighteenth century (1688-1795). This highly important extension of the cultivated area took place chiefly in the north and the west, due, in the first instance, to the opening up of the north and west to colonization and settlement. These sections had been, all through the course of English history, frontier country, sparsely occupied, with large areas of land not effectively utilized or cultivated. The new roads and canals contributed greatly to the development of these districts, first, by bringing colonists cheaply and quickly, and secondly, by making it easy to carry farm products to market. Wherever a new canal was dug, new farms were laid out and old farms enjoyed a new prosperity.

Ancient forests were cleared, and regions of barren heath became smiling cornfields.

Perhaps even more land was added to the area under cultivation by the tendency to abandon the medieval practice of allowing one field in every three to lie fallow each year. Because of the restricted number of cattle which could be fed over the winter, the amount of barnyard manure available for use as fertilizer was extremely limited. The so-called artificial fertilizers were unknown. Under these conditions the most effective way of renewing the fertility of the soil was to permit it to rest every third year. This practice still flourished on the great Midland plain, the richest agricultural land in England, when the eighteenth century opened. By the close of the century it was being abandoned rapidly with the result that a third more land was being used to grow food than was the case in the past.

Turnips and Clover

The abandonment of fallow came as a result of the discovery of better ways of renewing the fertility of the soil than by merely letting the sun and wind and rain take their course. On the continent, particularly in Holland, farmers had been experimenting with certain new crops, especially clover and other grasses, such as lucern (alfalfa), timothy, and cinquefoil, which have the characteristic of storing nitrogen in their roots and depositing it in the soil. Nitrogen is the active element in many types of fertilizers. Consequently the planting of clover on a field was equivalent to the application of a fertilizer, and fields planted with clover were found to be more productive than those which had lain fallow.

But the enrichment of the soil by growing clover was only one step in the new technique for increasing the output of the farm. Weeds were an acute problem. As the soil lay fallow the weeds were grubbed out and the land cleansed by scarifying or loosening the surface. How could the weed problem be handled without resort to fallow? The answer was found in the planting of turnips, which, growing chiefly underground, permitted the scarification of the surface almost as freely as if the field were unplanted. Turnips and clover, moreover, provided the hay and winter fod-

der for stock which made possible the increase of the numbers of sheep and cattle, the improvement of their breed, and the augmentation of the quantity of manure with which further to enrich the land. This was especially the case if the sheep were folded in the turnip fields and permitted to eat the turnips out of the ground.

Turnips and clover, then, formed the basic crops of a new agricultural technique, which made possible the constant use of the land, provided for the enrichment of the soil, and gave ample opportunity to cleanse the ground and free it of weeds. After the Revolution of 1688 it came to be the fashion for the financial and business leaders of London to buy estates in the country in order to found families and consolidate their political power. They were unable, however, to restrain their interest in profits; they insisted upon regarding their land purchases as investments which ought to pay a proper return just like an investment in a ship or a shop. This commercial spirit initiated a drive for improvement and progress, which spread from the new men to those more anciently on the land.

The county of Norfolk was the region where the greatest initiative was shown in experimenting with the new farming techniques. It was there that they were brought to perfection, and thence they spread to the rest of England. A system of crop rotation was worked out in this county which persists there even today. Turnips were planted in the first year, followed by barley in the second, clover or clover and ray-grass in the third year, and wheat in the fourth year. Various modifications of this rotation were adopted, but all depended on the alternation of roots, grasses, and grain together with the closest attention to the use of proper fertilizer. In the later part of the century potatoes began to be grown on a large scale as part of the rotation system. Since potatoes gave a yield of from 200 to 300 bushels per acre, it is easy to see how potato cultivation was probably as important an innovation as anything that ever happened in the history of agriculture. The potato, originally fed to pigs because despised by all but the poorest people, was to become in the nineteenth century one of the staple foods, without which England and Europe could never have attained to or supported their present populations. Yorkshire, Lancashire, and the North, the regions

where the population was increasing most rapidly, took up the potato before it was grown on a large scale in Norfolk, Kent, or in the West.

Jethro Tull

There was much in the new agriculture beside turnips, clover, and potatoes. There were new machinery, new arrangements of the fields, new relations between landlords and farmers, and improved stock. Perhaps something of the nature of the development of certain of these aspects of the agricultural revolution can be gleaned from a study of the careers of a few of the great farm leaders of the century.

Of these the first is Jethro Tull (1674-1741), who published the results of his experiments and inventions in two books, *Horse-Hoeing Husbandry* (1731) and *Horse-Hoeing Husbandry, or an Essay on the Principles of Tillage and Vegetation* (1733). Essentially, he was interested in the new types of crops, turnips and clover, and sought the most effective conditions for growing them. He did not introduce turnips into England, for they had been known long before his day, but he worked out the system of farming with turnips and clover which came to be generally adopted.

Tull was a man of irascible temperament. He could not tolerate other people's way of doing things, especially if their way seemed imperfect or careless. A good part of his time seems to have been spent in working out means of freeing himself from dependence upon hired help; and with that end in view he experimented with mechanical devices which would do better the operations which human hands had previously performed. His first significant invention in 1701 was a drilling or seed-planting machine, which planted the turnip and sainfoin seeds in regular rows, so that the plants could be hoed more easily. Earlier types of a machine for the same purpose are known in England and on the continent. Tull's drill worked, and it had the incidental merit of using less seed to the acre than the old-fashioned system of hand broadcasting.

To cultivate the soil about the plants more effectively, both to keep down the weeds and to admit the air into the soil and conserve moisture, Tull worked out a hoeing machine drawn by

horses. Of this machine he himself was so proud that he denominated his whole system of agriculture by the name of Horse-Hoeing Husbandry. He had a curious attitude toward manure, incidentally. He would not use it, for plants bred up and fattened amongst these toads and corruptions could hardly be good to eat.

Tull insisted on the most thorough preparatory pulverization of the soil, the correct planting of the seed with space enough between the plants to permit proper growth, and constant hoeing of the ground to conserve moisture and keep down the weeds. "The more the irons are among the turnips till the leaves spread across the rows the better" was one of his maxims. Elemental as these principles may seem, they were of much importance to English agriculture, and their acceptance made for progress.

Lord Townshend

Tull's own principles were given large-scale application by one of his own contemporaries, Lord Townshend (1674-1738), the brother-in-law of Robert Walpole. When in 1730 he found himself in disagreement with Walpole, with whom he had been associated in the Cabinet for ten years, he resigned his office as a minister of the Crown and turned to the development of his estates in Norfolk. His land was sandy heath; one wit said of it that a brief but exhaustive list of its products was "nettles and warrens." He began by reviving an ancient practice of spreading marl, a deposit of fossil marine life found in Norfolk in great beds, over the soil to enrich it. The marl added lime to the sand, and by its use alone during the course of the century three or four hundred thousand acres of waste were turned into gardens. Townshend's success with marl on sand was followed by experiments with manures and other fertilizers. Later in the century the greatest attention was paid to the manure heaps in the barnyard, with the view of conserving their nitrogen and ammonia.

Townshend's greater achievement was the large-scale cultivation of turnips and clover along the lines recommended by Tull. He drilled the seed, horse-hoed the young plants, and showed that great profits could be made out of the new crops used in rotation with wheat and barley, especially if part of the turnips were

fed to sheep folded on the field. The rest of the turnips and the clover were used to increase the stock on the farm, which was kept for meat and milk.

Robert Bakewell

Turnips and clover gave the requisite stock-feeding supplies, of which the lack had been one of the greatest factors in checking improvements in the breeding of sheep, cattle, and pigs. As long as all but comparatively few of the farm animals had to be killed and salted down every fall, there was little incentive to undertake improvements in stock. In so far as any attention had been paid to this matter, the wrong points were often emphasized. Prizes were offered for the animals with the longest legs. In Wiltshire sheep growers demanded a horn which fell back so as to form a semicircle in front of which the ear projected. In Dorsetshire everything was staked on the horn's projecting so that the ear was behind. The commons of England were full of tall, ungainly beasts of types local to the district. The first advances were made by a breeder named J. Allom, who crossed the local Ryelands and Warwickshire sheep in the hope of getting some improvement over the existing animals.

In 1750 Robert Bakewell of Dishley (1723-1795) began his work as a breeder. He recognized two things. The first was that in view of the growth of the population and of the rising standards of living, meat would be more valued than powers of draft in an ox or wool in a sheep. He set out, therefore, to produce animals which weighed most in the best joints, and which matured most quickly and soonest repaid the food which they ate. "Small in size and great in value" was his watchword, and he recognized that value lay not in the length of leg but in the weight of the body. The bones must be fine and the form compact. The true shape for profit was that of "a firkin [or barrel] on as short legs as possible." His second idea, intuitive and pragmatic, later to be proven by nineteenth-century science, was the principle of selection. Only those animals should be used as parents which possessed the qualities he wished to reproduce. In sheep he perfected the Leicesters, which fattened rapidly, matured early—in two years against three or four—and thrived where other sheep starved. His work with sheep was continued by later

breeders, such as Ellman of Glynde, who perfected the South-downs, and Jonas Webb of Babraham. Later in the century the importation of Spanish merino sheep added a new blood strain to the English flocks.

Charles Colling

Bakewell was less successful with cattle than he had been with sheep, possibly because he did not recognize the inconveniences of long horns on cows. He started with the Craven Longhorns of Westmoreland, using heifers developed by earlier breeders such as Sir Thomas Gresley of Drakelow House, but his cattle were little more than good milkers. The great name in cattle breeding is that of Charles Colling, who bred the Durham Short-horns. Other breeds, such as the Herefords, introduced by Tomkins, and the Devons, developed by Quartley, also had great worth.

The pig is much less distinguished in the annals of English economic history than the sheep or the cow; but it is doubtful if, because of its ubiquity and general utility, the pig is not more important. English breeds of pigs had pretty much run out by the opening of the eighteenth century. Improvements came in the first instance not by the breeding of native pigs up to certain standards but through the importation of new strains from China. The first of these reached England in the 1770's, and their mating with the English native sows produced the fine Berkshire breed. From these and from later importations of sires from abroad other varieties of value were evolved.

In any general chronicle of agricultural progress something ought to be said of a host of lesser men who contributed some new machine or some new practice. Water lying on the land was a centuries-old curse of English agriculture. Anciently, deep furrows had been relied upon to carry off excess precipitation. The draining of the Fens in the seventeenth century by the Dutch engineer Vermuyden showed the possibilities of dealing with surface water by drainage works. During the eighteenth century drainage ditches to collect the water began to be dug. Sometimes furrow drains were constructed by digging a trench, filling it partially with loose stone or brush so that the water could flow freely, and restoring the surface dirt. On great estates vaulted brick

channels were built occasionally. In 1764 Joseph Elkington of Princethorpe worked out certain principles of drainage which were later improved on by James Smith of Deanston, who stressed both drainage channels and subsurface plowing.

Plows continued to be amazingly cumbersome contraptions all through the century, although during its course lighter and improved forms began to be used. One well-known variety, used in Hertfordshire, had a beam 10 feet long and 6 inches square at the coulter-hole. The Kentish turnwrest plow contained "as much timber as would build a Highland cart." Shares began to be made entirely of iron during the second half of the century; the moldboards were made also of iron instead of wood, and were improved in form so as to turn the soil over to make a true furrow.

Although the scythe and sickle were used everywhere all through the century, and the primitive flail was used as in all past time to thresh the grain, unless occasionally it was trodden out on the ground by men walking over it, men already envisaged machines to do the laborious tasks of harvest time. Arthur Young mentions a threshing machine at Belford worked by a horse with a boy to drive and a man to feed it. Marshall, another great writer on agriculture, vaguely mentions another "thrashing-mill" in the west. In 1786 Andrew Meikle invented the first successful machine of this sort, using essentially the same principles employed in modern threshing machines.

Young and Coke

The great popularizers of agricultural progress were Arthur Young (1741-1820) and Thomas Coke of Holkham, Earl of Leicester (1754-1842). Arthur Young was himself a failure as a farmer, but he had a genius for recognizing good farming and for telling others of the best practices. In 1768 he published his *A Six Weeks' Tour through the Southern Counties of England and Wales*, and in 1770, *The Farmer's Tour through the East of England*. In these works he described in detail the crop rotation employed on the estates which he visited, with praise or blame for the practices which he saw. In 1784 he began to publish a periodical, *The Annals of Agriculture*, to spread the knowledge of good farming. Nine years later he became the secretary

of the semi-official Board of Agriculture. In his Reports he found another vehicle to propagandize for better farming.

A number of large-scale farmers, among whom was King George III himself, known on his Norfolk estates as Farmer George, provided practical illustrations of the wealth to be won from the new methods. Of these farmers, none was better known or more highly regarded than Thomas Coke, Earl of Leicester, whose estate was situated at Holkham in Norfolk. His predecessor in the earldom had had the bitter experience of being deserted by his wife, who refused to give him an heir and refused to divorce him or to give him cause to divorce her. In his bitterness he wasted his estates so that when Thomas Coke entered upon them in 1776 the country was little better than rabbit warren varied by long tracts of shingle and shifting sand. One farmer refused to offer more than five shillings an acre rent when his lease fell in. The village of Holkham had a population of under 200, and the poorhouse was always full. No wheat was grown in all that section of the county, and to feed the people from Holkham to Lynn 10,000 quarters of wheat were imported annually. Turnips were broadcast after three white crops in succession. No manures were purchased. There were no milk cows and the sheep were wretched. Apathy and stupidity characterized the farming of the region.

The young earl had already studied the best farming practices of France and England before he took over. He at once began to make improvements. Marl and fertilizer were used in abundance. Seeds were put in with the drill. Clover, turnips, and grains were planted in proper rotation. The old Norfolk sheep, of which only 800 were fed on 3000 acres, were extirpated. Experiments were made with the new Leicester sheep, the Southdowns, and Merinos; and eventually a flock of 2500 Southdown sheep was maintained. When Coke found that there were no sheep on the surrounding farms he urged the farmers to keep them. If the sheep died he would refund the outlay; if they lived, the profit was to be the farmers' own. The new breeds of cattle were introduced also; first, the Shorthorns, and then the North Devons because they gave more meat for less food. Children were employed to collect special seeds. Pastures were grown more rapidly than before by setting in small pieces of turf and sowing seed in the bare spots. By this process of "inoculation"

pastures were developed in two years which were said to be as good as those which took fifty years under the old system. Land that was useless for other purposes was planted with trees, oak, chestnut, and beech. Marsh land was reclaimed, and land once covered by the sea was brought under cultivation.

Experts were consulted on every new problem. When Coke wanted new breeds of sheep, he went to Bakewell at Dishley. When he inaugurated his land reclamation schemes he employed Strata Smith, the first English geologist.

Coke was much interested in plows and other machinery. He had such faith in a new plow that on one occasion he made a present of the plow to a friend in Gloucestershire, telling him that with two horses and a man it would do the work of a Gloucestershire plow which required six horses, two men, and a boy, with a saving of £120 a year. But so great was local prejudice in Gloucestershire that it was twenty years before the friend's neighbors adopted the new implement. In order to overcome such conservatism, Coke occasionally participated in public contests using the new plow. In the year 1801 he won a wager of 50 guineas that in ten hours with two horses he could plow an acre of heavy Hertford land, which normally, with an old-fashioned Hertford plow, required four horses for the work.

The matter of prejudice on the part of the local farmers against new tools, crops, and methods was a matter of greatest concern to Coke. He grew wheat nine years before anyone else would follow his example. He used the drill sixteen years before other farmers could be induced to do so. "Oh, it's beautiful," the farmers said, "and it's very well for Mr. Coke." Potatoes met with real resistance. For five years the villagers refused to look upon potatoes as food or to cultivate them, even when he offered land for growing potatoes free of rent. The first concession was that potatoes "t'wouldn't poison the pigs."

Coke was concerned with breaking down prejudice partly because he was interested in having the men who rented his land adopt the best practices in order that the value of his estate might be increased. Yet this was not his only motivation, for he gave long leases in order to encourage farmers and when the leases were renewed he did not raise rents to their economic levels. He often gave good tenants new houses as a bonus. He wanted to

see them well-off. He was glad that they could drink port, and was sorry that it was not claret or champagne.

The fact is that he had a real passion for good farming, and coupled with this was a kind of evangelical enthusiasm for spreading the good news of better crops and better methods. In his first year upon his estates he assembled a few farmers to discuss agricultural practices. In 1778 he held the first of his "Sheep-shearings" or organized meetings of farmers. These were held annually thereafter until 1821. The meeting of 1821 was attended by 7000 experts from England, Europe, and the United States, and was the most important agricultural congress of its time. In 1816 Dr. Rigby published his book on *Holkham and its Agriculture*, which did much to advertise Coke's work and spread widely a knowledge of its principles.

Between 1776 and 1842 Coke spent £536,992 in making improvements on his estates, not including what was spent on the house or the home farm and its buildings. In 1818 the timber alone brought in £2,700, and the whole estate had a rent roll of over £20,000, about ten times as great as in 1776. Norfolk was the richest wheat-growing land in England and exported vast quantities of grain to the rest of the country and abroad. The population of Holkham was 1100. There were no paupers and the poorhouse had been pulled down. Where there had been apathy there was now the greatest interest in and enthusiasm for good agriculture.

Enclosure

Yet in spite of the work of Young, Coke, and others, even at the close of the eighteenth century general English practice lagged behind the example of the best farmers. For this there were many reasons, but great importance must be attached to the traditional conservatism of the country folk of the day, the reluctance to make changes, the fear to leave old ways lest failure result. "Gentlemen may sow turnips," said one old farmer, "but we must take care to pay our rent." Very practical importance was given to the conservative point of view by the fact that in many parts of England, and particularly in the Midland plain, the communal control of agriculture by the entire village community still persisted. As in the Middle Ages, the village farm-

ing land was divided into three fields, each of which, though divided into acre strips individually owned, had to be planted with the same type of crop at the same time, and harvested likewise at the same time. During the season between harvest and seed-time, moreover, the fields were laid open to the cattle of the village, to glean the stubble. It was thus legally and physically impossible for any farmer or occupier in the village to initiate new departures on his own account. If he wanted to try turnips or clover, he would have to secure the assent of all those who had an interest in the village. Such unanimity in favor of progressive measures was all but impossible. Then again it was felt that the large farm was better suited than the small one to the new methods. Arthur Young wrote in 1771, "It will at once be apparent that no small farmers could effect such great things as have been done in Norfolk. Great farms are the soul of Norfolk culture; split them into tenures of an hundred pounds a year, you will find nothing but beggars and weeds in the whole county."

Individual Enterprise and Enclosures

There remained for the enterprising landlords, farmers, and occupiers but one recourse: to substitute individual direction for communal control. The old village community had to be dissolved, common rights in the open fields extinguished, and the interests of all the villagers in the meadow and common waste distributed. In place of a village with open fields in which every man's land was in scattered lots communally controlled, there was introduced a village in which each occupier had his land in a single parcel, surrounded by a fence. On the new several farms each individual holder planted what he pleased and when he pleased, he made what improvements seemed best to him, and he reaped the profits of his initiative free from the hampering and restrictive bounds of custom and of social control.

The general name which is used to describe these changes in the English villages is enclosure. It will be recalled that already in the sixteenth and seventeenth centuries a good deal of enclosure had gone on where it was profitable to turn ancient arable into sheep pastures or where access to a market rewarded the farmer for more intensive cultivation. The enclosure movement of the eighteenth century is in a sense a continuation of the earlier in

function and purpose, although its procedure was somewhat different. In the sixteenth century the enterprising landlord took advantage of legal technicalities to force the peasant occupiers off the land, so that he might lay field to field and bring all together as a great sheep farm. Or, on occasion, the smaller holders exchanged their acre strips with each other so as to form compact holdings, which they could manage on a unified basis. Although a certain amount of enclosure had taken place in these ways, the greater part of the country in which the open field system had originally prevailed was unenclosed when the eighteenth century began. This was particularly true of the Midland plain.

During the earlier part of the century enclosure frequently took place by unanimous agreement registered in chancery. Under the leadership of an enterprising landlord who wanted to increase the rental value of his lands by making them adaptable to the new techniques, the other villagers were persuaded into signing an agreement to enclose. But presently, when this method no longer worked, the interested proprietors accomplished their purposes by securing an act of Parliament to effect the enclosure of their village. In this case unanimous consent was not required; but on the other hand the costs were excessively high, beginning with the extravagant fees for solicitors. Then there were the charges of the surveyors and engineers, the expenses of roads, fences, and drains, and finally the allowances of the commissioners to whom the entire village would be turned over for several years until the consolidation and reallocation were completed. For one village of 2400 acres, the manor of Great Wilbraham in Cambridgeshire, the costs of enclosure in 1797 amounted to £2,994, or more than £1 per acre. This sum was assessed on the proprietors in proportion to their holdings, and was an especially heavy charge at a time when other capital improvements such as internal fencing, new machinery, and new stock had to be provided for. In 1801 and in 1845, in order to reduce somewhat the costs of enclosure, general enclosure acts were passed. Under the terms of the later act any village as yet unenclosed could carry through the process without a separate parliamentary act merely by complying with the requirements of the general statute.

When the enclosure commissioners had finished their work in a village it had quite a different aspect from that which it had worn since the Middle Ages. Gone were the three great open

plowed fields with their crazy quilt appearances created by the acre strips separated by double furrows. Gone were the meadow and the great common waste. In their place were fenced individual holdings, each proportioned according to the totality of rights which the occupier possessed in the village and each under his unrestricted control and use. Land which had previously been plowed for centuries was now often used for grazing ground; land never before plowed, as, for instance, the land of the common waste, was often now a plowed field. Through this process of enclosure it is estimated that as much as 2,000,000 acres of land formerly common waste was added to the cultivated area. This would not represent so much net gain, however, for the common waste had previously been used as grazing ground, besides furnishing wood and other products for the villagers. The essential point is that it was now possible for each occupier to use his land to his own best advantage; and it was generally believed that if he did so, he could not help but advance the common good. It was this situation which the economists, led by Adam Smith in his *Wealth of Nations*, rationalized into the doctrine that the individual in seeking his own best ends inevitably contributed to the general welfare. They so highly esteemed the results of the abandonment of communal control in favor of individual enterprise that they enlarged upon this practice to demand the abolition of all restriction upon the individual in favor of free and unrestrained competition. It is worthy of note that agricultural protection in the form of corn laws was operative all through the period of most rapid progress. While this sort of mercantilist assistance to agriculture did not bring about progressive developments, it did act as a sort of brake against excessively high or excessively low prices and so cushioned the lag between suddenly increased production and the absorption of the same in the market.

There can be no question that the new agriculture produced from year to year a greater amount of wheat, wool, meat, and hides than had ever been produced before. There are certain figures available which illustrate the progress of the century. Though the English population increased by nearly 80 per cent from 1700 to 1800, and though some 9,000,000 people lived on a higher standard in 1800 than 5,500,000 did in 1700, England was still able to feed her own people with her own foodstuffs

throughout the entire century. More than that, even toward the end of the century, except in years of crop failure, she had an exportable surplus of about one-twentieth of the entire wheat crop in an average year. In a good year one-eighth of the crop was exported. Another illustration of the nature of agricultural progress is afforded by the figures for the weight of cattle and sheep sold at the Smithfield (London) market. In 1710 average beeves weighed 370 lbs.; in 1795, 800 lbs. Calves averaged 50 and 148 lbs.; sheep 28 and 80 lbs.; and lambs 18 and 50 lbs. at the respective dates. It must be remembered, to make this illustration complete, that the stock of 1795 matured more rapidly than that of the earlier days of the century, and that it thrived where the older beasts had starved. It is the universal opinion that the wheat and grain yield in bushels per acre increased remarkably on enclosed land. One writer estimated that while on unenclosed land wheat yielded 15 bushels per acre and barley 24 bushels per acre, the yield of wheat on an enclosed farm practicing the new rotation was 25 bushels and of barley 40 bushels per acre.

Yet though the nation as a whole benefited from the agricultural progress of the eighteenth century which is epitomized in the enclosure movement, it must not be overlooked that there were many individuals and even whole classes for whom the changes were disastrous. First among these were the small farmers, known as yeomen, farming perhaps thirty acres in the common fields, with a few cows on the waste and rights in the meadow and woodlot. These men had little capital except such tools, stock, equipment, and furniture as they had in their barns and houses and on their land. As soon as a village was enclosed, they were called upon to pay their shares of the enclosure expenses; and on top of that came the necessity of heavy outlays for internal fencing and for new equipment. To meet these obligations there was nothing to do but to raise money by mortgage. Often, after a brief struggle, rendered the more bitter by the fact that the small man found it impossible to keep his sheep and cattle because the common shepherd and the cow common had gone, the yeoman disposed of his equity and moved to a town to enter the ranks of industry. The decline of the yeomanry seems to have proceeded steadily during the whole period from 1700 to 1785. The high grain prices of the period of the Napoleonic wars gave the small holder

a respite. Indeed, small holders and their numbers even increased between 1785 and 1802. But with the turn of the nineteenth century the number of small farmers again began to fall, and England became that unique phenomenon among the European nations of the nineteenth century, a land without an agricultural small farmer class. This does not mean that there are no small farmers who own their own land left in England, but that they are few in number in comparison with other countries.

The elimination of the small farmer completed the process of England's becoming a land of large proprietors, with the farms consolidated and rented to capitalist farmers. Consolidation in itself was not an unmixed evil, since it created large farming units which could be managed more efficiently than the smaller farms had been handled. Indeed, some students hold that without this business of consolidation into large farms, the advantages of enclosure would not all have been realized. According to a survey of the year 1874, 217,549 persons owned 3,931,806 acres of agricultural land in holdings of from one to one hundred acres. The rest of England's farmland, 27,000,000 acres, was owned by 38,214 persons in holdings of over 100 acres.

While the yeomanry was merely extinguished, the agricultural laboring class was debased. Forming the largest single numerical group in the English population when the eighteenth century opened, the agricultural laborers actually increased their numbers greatly during the century. Moralists and hard-hearted rate-payers never ceased to clamor against their imprudent marriages and impudent fertility.

The agricultural laborers, they and their fathers before them, had been resident in the villages for centuries. They had even nicked out little plots of from two to five acres on the common waste, where they built rude cottages, gardened a little, and kept a cow or two to eke out the miserable earnings which they received from the farmers and yeomen for doing the backbreaking manual toil of plowing, reaping, and flailing on the village lands. But they never acquired any legal rights to their usurpations, and they had no legal share in the property of the village. Consequently when the enclosure commissioners reallocated the land, no provision was made for the agricultural laborers. They were deprived of their cottages and their gardens. They had in consequence to give up their cows and were left utterly dependent

upon their wages. On the part of many a farmer this was a consummation devoutly to be desired, for as long as the laborer had a garden and a cow, he could hold out for better pay; he could even refuse to work at times when work was pressing. Now he had no recourse but to work or starve, and work for whatever wages the employer chose to offer. Actually wages rose between 1760 and 1800 by about 20 per cent. Yet this increase was merely a partial response to a general price rise of about 60 per cent in the same time. As a result the agricultural laborer suffered a tremendous decline in real wages and was forced to fall back on a lower standard of living. And how mean that standard was may be judged from a study of what Arthur Young considered a model budget for an agricultural laborer's family of five. On the first day of the week the food was to consist of two pounds of bread made of equal parts of rye, wheat, and potato, two ounces of cheese, and two pots of beer. On the second day there were to be three messes of soup, made of lean beef, peas, potatoes, rice, onions, celery, salt, and water. Next day, rice pudding, made of one-half pound of rice and two quarts of skimmed milk and sugar. On the fourth day there should be one-quarter pound of fat meat and one and three-quarter pounds of potatoes, boiled together, and beer. The fifth day was really skimpy; for it there was provided two pence worth of rice and milk. The sixth day was the same as the first; but on the seventh day the family gorged on potatoes and fat meat (two and one-half pounds), two ounces of cheese, and beer. This food was to cost £15 12s. (\$75.00) a year. Rent would come to £1 10s.; clothing, £2 10s.; soap and candles for lighting, £1 5s.; and loss of time and expenses due to sickness, £1. The total for five people thus arrived at would come to £21 17s. a year or 8s. 5d. a week. "It may be said," Young went on, "that wheaten bread, that beef, that mutton, that tea, that sugar, that butter are dear; but do not, in the height of the argument, jumble these and the necessities of life together." The consumption of tea Young regarded as an economic crime. He believed that the staple diet of this class should be potatoes and rice, and he presupposed the necessity of the labor of the wife and children in a family to earn even the standard which he held up.

Such is the lack of clear vision on the part of even great men in the midst of social change that Young thoroughly approved

of the treatment accorded the laborers in the enclosure process. He insisted that the laborers had no rights in the village and that the enclosure commissioners were justified in dispossessing them from the precarious holdings which they had nibbled off on the waste. He shared the current view that the reliance of a laborer on the imaginary benefits of possessing a cow or two, a hog, and a few geese was morally injurious. "It inspires some degree of confidence in a property," wrote another authority, "inadequate to his support. In sauntering after his cattle, [the laborer] acquires a habit of indolence. . . . Day labour becomes disgusting; the aversion increases by indulgence; and at length the sale of a half-fed calf, or hog, furnishes the means of adding intemperance to idleness." But in the enclosed village a spirit of activity and industry was excited, "whereby habits of sloth have been by degrees overcome, and supineness and inactivity have been exchanged for vigour and exertion."

Toward the end of his life, after a great deal of the damage had been done, Young recognized the social disaster which was overtaking the land, and he pleaded the cause of the poor with real passion. In 1801 he wrote, "The fact is, that by nineteen enclosure bills in twenty the poor [that is, the laborers] are injured, in some grossly injured. . . . What is it to the poor man to be told that the Houses of Parliament are extremely tender of property, while the father of the family is forced to sell his cow and his land because the one is not competent to the other; and being deprived of the only motive to industry, squanders the money, contracts bad habits, enlists for a soldier, and leaves wife and children to the parish? . . . The poor . . . may say, and with truth, *Parliament may be tender of property*; all I know is, I had a cow and an act of Parliament has taken it from me." "Go to an ale-house kitchen of an old enclosed country, and there you will see the origin of poverty and the poor rates. For whom are they to be sober? For whom are they to save? (Such are their questions.) For the parish? If I am diligent, shall I have leave to build a cottage? If I am sober, shall I have land for a cow? If I am frugal, shall I have half an acre of potatoes? You offer no motives; you have nothing but a parish officer and a workhouse. Bring me another pot."

In certain cases villages were depopulated after enclosure, since the landlord consolidated his fields and laid them down as pas-

ture. Fewer workers were required and many of the laborers were compelled to leave. Oliver Goldsmith in 1770 wrote *The Deserted Village*, a poem about the village of Auburn, in Ireland, where something of the same kind of thing was happening.

Ill fares the land to hastening ills a prey
Where wealth accumulates and men decay.

Many people thought he was describing a general condition; and even today those who read the poem picture the countryside in the throes of a cataclysmic change. Actually, however, only villages where circumstances were especially favorable for grazing were thus transformed and depopulated. In a general way, where land previously under the plow was laid down in grass, an equivalent of the unplowed waste was turned to arable use. There was perhaps a slight decrease in wheat land before 1800, but this decrease was more than compensated for by the increase in land sown to barley and oats. After 1800 there was a considerable increase in the amount of wheat land also. Moreover, enclosed arable land entailed more labor than unenclosed land, since more intensive cultivation was practiced. Actually the increase of the farm laboring population was not incompatible with the depopulation of a certain number of villages. No, the real disaster was not the desertion of a few villages. It was the degradation of a whole social class to such a nadir of misery that they were to poison the well-being of the whole of English life. The shocking thing is that this degradation was not a necessary concomitant of progress.

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THE INDUSTRIAL REVOLUTION: A REVOLUTIONARY WAY OF LIVING

It is sometimes thought that the great stimulus to production which was undoubtedly a fact in the eighteenth century was provided by the set of laws and state regulations of economic life known as mercantilism. Other students suggest that the real causation is to be found in the improvements in transportation and communication by land and sea, culminating in the expansion of colonial and foreign trade.

In all probability, however, mercantilist regulations merely directed men's energies in certain minor ways, by circumscription or encouragement, without doing very much to bring them into being or to increase their effectiveness. In the matter of transportation and shipping it is easy to see that better ships made trade easier and lower freight rates made it possible to import and export goods which previously could not bear the costs of carriage. But improvements in shipping did not create goods. Foreign and colonial trade may just as well have been an expression of the search of goods for a market as of the demand for goods by a market. That is to say, it may be as true that overseas trade increased because Englishmen had goods which they wanted to sell as that the enhanced opportunities to sell goods abroad through the growth of trade led to enlarged production at home. The second of these premises is undoubtedly true in certain cases; so is the first in others. Even in the second case, there is a greater volume of goods demanding sale, though here the expansion in production is taking place in another country rather than in England. We are thus thrown back to the original problem; namely, to what can the rapid increase in production during the eighteenth century as compared with the past be at-

tributed? In the case of agriculture some answers have already been suggested, such as the new crops and techniques, the increase of the area under cultivation, especially in northern England, the abandonment of communal control and enclosure. Here the basic factors seem to be the possibility of greater profits presented by new crops and new methods to those individuals with sufficient initiative and intelligence to introduce and practice them. The new crops—turnips, clover, and wheat—and the new methods, involving better farm implements, drainage, fertilizers, and the end of the common fields, were themselves the result of a long accumulation of observed data and scientific deduction.

A study of certain selected industries, where progress was relatively great, may be compared advantageously with the agricultural experience. These industries are characterized by an interesting combination of novelty in products and of scientific or pragmatic advances in technology.

At least part of the story of the why of increased production in industry in the eighteenth century is to be found in the appearance of certain commodities which met certain definite wants on the part of the people. Cotton cloth, cast iron, and earthenware, which were goods of this sort, were in reality new kinds of materials, hitherto not used in England to any great degree, which during the eighteenth century were introduced into common use. They were capable of quantity manufacture and were acceptable to growing proportions of the population who were themselves working harder than ever before making other goods or growing meat or grain or mining coal and minerals in order to be able to buy the additional articles they themselves wanted. Thus cotton cloth was eagerly adopted because its designs were beautiful, because it could be washed easily, because it was light in weight and yet had great wear, and because it was cheap. As compared with woolen cloth or with linen, cotton had advantages of convenience and utility. Cotton was an ideal material for mattress covers, sheets, undergarments, draperies, upholstery fabrics, dresses, men's shirts, stockings, and lace curtains. Once the new goods were on the market, their use became general in a very short time, and there grew up in connection with their production a kind of industrial system as novel as the goods themselves. Just as in the early twentieth century the appearance of the automobile was followed by the rapid extension of its use and by the development

of an almost new industrial setup for manufacturing it, so in the eighteenth century popular response to the appearance of cotton cloth, cast iron, and earthenware dishes led to the rapid development of their manufacture. This in turn brought reduced prices which led to still further extension of sales. Technological innovations and inventions of machinery to meet insistent demand in one of these lines often spread to the production of older types of goods. This was the case with the adoption in the woolen cloth industry of machinery and processes devised for the cotton goods trade.

Rapid and widespread acceptance of the new materials led to efforts on the part of aggressive and enterprising producers to manufacture the product cheaply and extensively in order that they might make as great profits as possible. Improvements in transportation were considered just one element in more efficient and cheaper production.

The articles just named, cotton cloth, cast iron, and earthenware, were not the first commodities to be made in England for which there was a large demand, and the industries which grew up in connection with their manufacture were not the first large-scale enterprises known in England. Before the eighteenth century opened large-scale operations in large plants were carried on in the making of glass, alum, salt, soap, and wrought iron; and great amounts of capital were invested in coal mines and in colliers (ships for carrying coal from Newcastle to London and to European ports).

A more exact differentiation between the new type of industry which grew up in connection with the new materials and that which already prevailed may be worked out by an examination of the history of some of the new trades. In some ways cast iron is most representative.

Cast Iron

Iron as an article used in everyday life goes far back in human history. For centuries it was produced by smelting iron ore fluxed with limestone on a hearth fired with charcoal. Combustion was intensified by blowing the charcoal with a bellows worked by hand or by water power. In the course of centuries many improvements had been made in the process. In the sixteenth century

furnaces replaced the open hearth, and it seems to have been possible to produce in the furnace a liquid iron which could be drawn off and run into molds known as pigs. This pig iron might be melted again and cast into cannon or cannon shot and even into rather crude cast-iron articles, such as firebacks for fireplaces and graveslabs. The iron thus produced was too impure to give good results for finer casting. It was extremely brittle, and most of it was refined and made into bars suitable for the smith by further heating and beating on a forge. The bars were cut and hammered on the anvil into the various objects for which iron was commonly used, such as nails, plowshares or knives.

Iron thus made in the furnace and fined on the forge was known as wrought iron. It was nearly pure Fe, free from impurities and admixtures, ductile, malleable, of great tensile strength, and resistant to rust. It was made in quite small quantities, and because of the human labor and of the inordinate amount of charcoal needed both in the furnace and on the forge, it was high in price. English bars sold at about £16 a ton for the "best tough" and £14 for "ordinary tough." The corresponding grades of Swedish and Russian iron were sold at £15 and £11 per ton. At one English works over 400 tons of bar iron could be produced annually, but the normal output of a forge was between 50 and 150 tons of bars a year. In all England in 1720 production is estimated at 25,000 tons of pigs. The forges had a capacity of fining pigs to produce 18,000 tons of bars.

It is just possible that this figure represents a decline during the past half century. The use of wood for charcoal and the cutting down of timber to clear more land for farming threatened the very existence of the English iron industry. Furnaces and forges in Sussex, the ancient center of iron-making, were especially hard put to find fuel owing to the exhaustion of timber. Even in the Forest of Dean there was a tendency to restrict activity to smelting and to convey the pigs up the Severn to the more recently opened forest areas of Shropshire, Worcester, Warwick, Stafford, and Chester, where forges were established to fine the pigs into bars. There was a general tendency for the industry to migrate to the areas where timber was still plentiful, such as Westmoreland, Cumberland, Wales, and southern Yorkshire. Yet in spite of such movement, the production of bar iron remained stationary or even declined somewhat during the thirty

years after 1720. To meet English needs bars were imported from abroad, particularly from Sweden; and this importation increased from 17,000 tons in 1721 to 24,000 tons in 1737. In the ten years between 1750 and 1760 the tide turned, and English production began to increase.

The solution of the fuel problem came with the use of coal in place of charcoal. Ever since the beginning of the seventeenth century a long series of ironmasters and projectors had experimented with coal as a fuel without success. When the substitution of coal for charcoal was finally worked out, the iron smelted with coal possessed characteristics which varied considerably from those of iron as previously made. The processes of smelting and manufacture were much altered. The changes in both product and technology were so important that it may be said that an entirely new industry was set up, turning out a new material by newly invented techniques. The new kind of iron was known as cast iron. From the smelting of cast iron the use of coal was extended to forging and other older processes of the iron industry.

Iron castings as known in 1700, produced from the pigs made in the charcoal furnace, were so brittle that only heavy articles such as chimney backs and garden rolls, in addition to cannon and shot, were cast. "For such purposes as these, this serves well enough, but for others it will not, for it is so brittle, that being heated, with one blow of a hammer it will break all to pieces," said an early expert. Another obstacle in the way of casting other kinds of articles was that the art of mold-making was very backward.

In 1699 Abraham Darby, son of a maker of nails and locks who combined farming with his craft, set up business in a brass and iron works. He soon began to make experiments with the use of cast iron for articles previously made of brass. After initial difficulties with the making of molds, he went to Holland to learn how the Dutch made their cast-iron pots and kettles and brought back with him some Dutch workmen. In 1707 he took out a patent, probably based on improvements in mold-making, involving the use of sand instead of loam in the molds for casting iron pots and kettles. In 1708 Darby took a lease on an old furnace and forge at Coalbrookdale in the Severn valley in Shropshire, and here in 1709 he began to cast pots, kettles, firebacks, mortars,

pipes, and other wares. According to an account written by his daughter-in-law, he first blew his furnace with charcoal, but some time afterward he had the idea that it might be practicable to smelt the ore with coal. After failure with raw coal, he reduced the coal to coke by roasting it; and using coke as a fuel he was successful in making good iron. Coke gave greater heat than charcoal and provided for better fusion of the ore. As it came from the furnace the coke-smelted iron was more liquid and ran freely into the smallest channels of the molds. There is a legend, which curiously has become associated with Abraham Darby's son, Abraham Darby II, of how he spent six days and nights of sleepless vigilance on the bridge of the furnace fired with the new coke fuel, finally to be rewarded by seeing the metal flow out "free and pure." These last words indicate that Darby was more concerned with finding a fuel that would give him a better iron for casting than with providing a substitute for charcoal. At any rate, he did both these things. A new type of iron for casting was now available. The quantities which could be produced were not limited by the wood supply; and, with the improvements in mold-making, the most intricate forms could be cast.

In 1726 a son-in-law of Darby's, John Hawkins, took over the Bersham Iron Works near Wrexham, where coke fuel had been introduced in 1721. Later this plant was to be run by Isaac Wilkinson. During the 1750's new coke blast furnaces were set up at Horsehay, Ketley, Madeley Wood, Lightmoor, and Willey in the Coalbrookdale district and at Dowlais in South Wales. In 1760 the great Carron Works in Scotland adopted the new process, and later it was introduced at iron works in Staffordshire, South Yorkshire, Northumberland, and elsewhere.

Cast iron was cheaper than wrought iron because less and cheaper fuel was used in its production and because a considerable amount of highly skilled labor in the forge and smithy was saved. The new metal began to be substituted for wood, copper, lead, brass, and even for wrought iron. In 1722 Richard Baddeley obtained a patent for making smoothing-irons (for laundry work) of cast iron instead of wrought iron; and in 1738 Isaac Wilkinson made a commercial success out of such an iron. In 1751 and 1761 patents were granted for making gun-carriages of cast iron. In 1769 and 1771 Joseph Ashton began to make coffin-nails, tacks, and other nails of cast iron. Other patents were taken out for

making cast-iron hinges, buttons, hoes, and slave bracelets. Enthusiasts even attempted to use the new metal for wagon tires, knives, razors, and bits and stirrups, but for these purposes it was too brittle and too deficient in strength. Yet in making domestic stoves, fire-grates, lock-gates for the new canals, rails for the railways which connected mines with the canals, bridges, castings for steam engines and parts of machines, cast iron became one of the most important materials in the new civilization. Over and above all this, the use of coke as a fuel, which had been introduced as part of the process of making cast iron, was eventually adapted to the needs of the wrought iron trade.

The firms which engaged in the manufacture of the new material went ahead with unprecedented momentum. Starting out as small undertakings, they presently became establishments of great size and complexity of organization. The works at Coalbrookdale were begun on a very modest scale. By 1715 they were worth something over £5,000, and Darby himself had an interest in two other iron works. The products commonly made at this time were mortars, boilers for soap-works, chimney-backs, garden-rollers, pipes, and weights. In 1718 the firm began to make castings and pipes for a Newcomen fire-engine, and after 1724 castings for Newcomen engines were manufactured on a large scale, together with parts for the pumps which were connected with these engines. When the patent rights on the Newcomen engine expired in 1733, there was a great increase in this kind of business.

The growth of business led the Darby firm to blow in a new furnace at Willey in 1732, one at Horsehay in 1755, and one at Ketley in 1756. In 1743 the second Abraham Darby, now head of the house, ordered a Newcomen fire engine to pump back water into an upper reservoir, from which it fell over the water wheels working the blast pumps, so that operations might not be interrupted by seasons of drought and by failure of water. In 1754 five fire engines were in use to run water wheels for providing the blast for seven furnaces, each of which turned out twenty to twenty-two tons of iron per week. Later the engineer Smeaton improved the blast by installing new air pumps. The output per furnace was increased to forty tons a week.

In 1756 Richard Reynolds, son-in-law of Abraham Darby II, became head of the firm. Under his control the Darby company became a kind of industrial empire, with a series of plants under

their direct control and others in which they owned an interest. Coal and iron mines were leased to provide raw materials. Railways were constructed between the plants and from the mines to the Severn to carry coal, ores, and other materials more cheaply, since one wagon drawn by three horses carried as much as could be loaded on the backs of twenty horses. In 1779 the Severn itself was spanned by a cast-iron bridge. By this time the turnover of each of the five plants at Coalbrookdale, Madeley Wood, Lightmoor, Horsehay, and Ketley exceeded £80,000 a year. Richard Reynolds himself wrote in 1785 of "the many hundreds of poor people employed by us in working and carrying on mines, etc., for the supply of a large sale of coals by land and water, and of coals and mine [ore] for sixteen fire engines, eight blast furnaces and nine forges, besides the air furnaces, mills, etc., at the foundry at Coalbrook Dale, and which with the levels, roads, and more than twenty miles of iron railways, etc., still employs a capital of upwards of one hundred thousand pounds." Much of this vast capital represented earnings which had been plowed back into the company year after year.

Another great family in the cast-iron trade was that of the Wilkinsons, who in the 1750's established themselves at Bersham, where coal had been used for smelting ore ever since 1721. Here they cast guns or cannon, fire engines, cylinders, pipes, and sugar rolls. On the death of Isaac Wilkinson, the father, his son John Wilkinson became the dominant member of the family, and by 1770 John and his brother owned works at Bersham, Bradley in Staffordshire, and Broseley. Though later they entered the trade of fining and forging and extended their business connections to all parts of England and to France and Germany, at first they confined themselves to smelting and casting. They were especially interested in ordnance contracts and supplied heavy guns to the navy and to the East India Company. In 1774 John invented a cannon-boring machine which gave such superior precision to the bore of cast-iron cannon that Bradley became one of the great ordnance manufacturing centers of Europe, supplying guns not only to England but to her rival, France, as well. It was with this boring machine that in 1775 Wilkinson bored a true cylinder for Watt's first steam engine. During the next twenty years the Wilkinson company was closely associated with Watt and Boulton, the proprietors of the new engine. Down to 1795 virtually

all the cylinders and many of the cast-iron parts for the Watt and Boulton steam engines were supplied by the Wilkinsons.

Even before Isaac Wilkinson took over the Bersham furnace, three brothers, Samuel, Aaron, and Jonathan Walker, schoolmaster, mechanic, and farmer respectively, began to make cast iron at Grenoside near Sheffield in southern Yorkshire. During the first year, from November, 1741, to November, 1742, they cast five tons, and, according to the figures in Samuel Walker's pocket-book, the value of their plant was nil. In 1746 they cast $63\frac{1}{2}$ tons, and their works were put down as worth £600. In this year they started a second furnace at Masborough near Rotherham, where water power, water transport, and supplies of coal and ore were more convenient. In 1760 they were casting $432\frac{3}{4}$ tons, besides being interested in steel and wrought iron; their plant was valued at £11,000 and six years later at £31,000. During the war of the American Revolution the Walkers cast ordnance on a large scale. In 1781 three-fifths of the metal cast, 1221 tons, went into cannon. They constantly turned their profits back into their business, which was valued at £213,393 in 1795.

Of somewhat different design from these firms which started with almost nothing was the Carron Ironworks established in Scotland in 1759 as a joint stock company with considerable capital to begin with by John Roebuck and Samuel Garbett. Everything, even the site, was planned with a view to the greatest efficiencies of production and transportation in the smelting and casting of iron. The Carron Company specialized in domestic stoves and grates, iron pots, castings for fire engines, and, above all, in ordnance and other war materials. Their great guns "which were cast solid, and bored by a drill worked by the whole force of the River Carron," were exported to Russia, Denmark, Spain, and other countries. The "carronade" which they began to manufacture in 1778 was a famous naval weapon. In 1760 the capital stood at £12,000 held in 24 shares; in 1773 at £150,000 in 600 shares, of which Garbett held 96.

The works which the Darbys, the Wilkinsons, the Walkers, and Roebuck and Garbett set up for making cast iron all became centers from which the manufacture of the new metal spread in various directions. The corner of Shropshire where Coalbrookdale and Broseley are located was studded with furnaces, and Coalbrookdale itself was the model for much that was done at Carron.

From Coalbrookdale in 1783 the Parkers, relatives of the Darbys, moved to Staffordshire to set up the Coneygre furnace. In 1760 John Guest left Broseley to start his great works at Dowlais; and the Homfrays of Cyfarthfa, the Thorneycrofts of Tipton, the Bagnalls of Wednesbury and West Bromwich, and the Gilpins of Coalport all came from the same district. A quarrel between the Walkers and their partners, the Crawshaws, led the latter to set up their own works. Thomas Chambers, one of the partners in the Thorncliffe Ironworks, was trained at the Walker plant, and one of Samuel Walker's sons started the Gospel Oak Works in Staffordshire, out of which several other concerns took their origin. In later years the Carron Works contributed to the foundation of many important furnaces in Scotland, such as the Clyde, the Devon, the Calder, Crammond, Cleugh, Muirkirk, and Falkirk Works. Even on the continent there were offshoots of the English plants. In the years from 1778 to 1781 William Wilkinson superintended the construction of the Le Creusot blast furnaces; in 1789 one of the Wilkinsons was building a blast furnace in Upper Silesia. During this decade Garbett's son-in-law, William Gascoigne, was in Russia with Carron-trained workmen to found a gun-casting plant in Russia.

Further progress in the iron trade came in 1783 when Henry Cort and Peter Onions, working independently, discovered a way of changing the brittle cast iron produced by the use of coal into a less brittle and stronger material known as *puddled iron*. Puddled iron resembled wrought iron in its characteristics, but its production was not limited by the amount of charcoal available.

Earthenware

At the beginning of the eighteenth century ordinary people ate from wooden trenchers or platters, while the well-to-do set their tables with pewterware. Among the rich there were table services and separate pieces of Delftware, made in Holland, and Chinaware, imported by the East India Company from China. As the century went on attempts were made in England to imitate the Delft and Chinaware; and works were set up in Plymouth, Bristol, Derby, and Worcester, and in Chelsea, Bow, and other places in London to make porcelain tableware and porcelain ornaments. These goods were of fine quality and intended only for the

wealthy. Their artistic achievement was high, but their economic significance was on a level with that of other fine work in painting, carving, and sculpture. What we are concerned with here is a more plebeian product, earthenware, to be distinguished from porcelain by the fact that it is opaque, while porcelain is translucent.

Earthenware manufacture in England, down to the end of the seventeenth century, turned out only the crudest articles. The colors ranged from dull yellow to gray brown, the glaze was uneven, the surface rough and mottled, and the shape and form clumsy. An old-fashioned stoneware demijohn or vinegar bottle will give some notion of the quality and appearance of the earthenware crocks, cups, platters, and dishes of the time.

Just after the Revolution of 1688 two Germans, John Philip Elers and his brother David, came to England and, settling in Staffordshire, introduced great improvements into the art of pottery-making. They are credited with having brought in the process of glazing with salt, they used the lathe to turn their pieces into thinner forms than could be done on the wheel, and they washed, stirred, and otherwise prepared their clay with great care. The Elers left Staffordshire about 1710 to set up an establishment in London, but their secrets had been learned by the native potters of the district, who added improvements of their own. Thus about 1720 two former workmen at the Elers' plant, named Astbury and Twyford, were making salt-glaze ware with a superior "body." This was achieved by mixing ground calcined flint with the clay to give greater fineness of grain and whiteness of color and a higher degree of refractoriness in the burning as well as less shrinkage. Astbury's son Thomas greatly improved the color of his products, producing a cream color which was later perfected by Wedgwood.

During the forty years after 1720 many other improvements in the technique of earthenware production were made, such as the use of the slip-kiln for better firing, the determination of various clay mixtures for different kinds of bodies, the introduction of liquid glazes or dips, and the employment of plaster of Paris molds to produce perfect forms.

One of the best-known families in the pottery district centering in Burslem was that of the Wedgwoods. In 1754 young Josiah Wedgwood, then aged 24, entered into partnership with Thomas

Wheildon, one of the foremost potters of his day, to make tortoise-shell pottery, cauliflower ware, mustard pots, salt and pepper shakers, bread-and-butter plates, teapots, coffee pots, sugar bowls, and mugs. In 1754 Wedgwood invented a "new green earthenware, having the smoothness and brilliant appearance of glass." Five years later Wedgwood started his own works, and presently he was occupying three premises in Burslem. Constant experiments were carried on with clay mixtures and with new glazes. Kilns that heated more evenly were designed. A whole series of new tools were invented and the lathe was greatly improved. The work in the plants was so organized that each workman dealt with a single set of operations in which he acquired the greatest skill. Much of the experiment that Wedgwood carried on was designed to improve his ornamental wares, which took every form from vases and statues to small cameos. Yet even these experiments were of value to the "useful wares" which represented the vast bulk of Wedgwood's output.

The romance of the Wedgwood potteries inevitably connects itself with the black basalt and jasper wares which are still the pride of many collectors' cabinets. Real economic significance attaches, however, to the queen's ware, intended for everyday table use. This ware was an improved form of the common cream ware of the Staffordshire district with a very hard body and a brilliant surface, obtained by new mixtures of clay and improved glazes. The name derived from the fact that Wedgwood presented a breakfast set of his new ware to Queen Charlotte, who appointed him Queen's Potter and graciously permitted him to name the new ware in her honor. It was fine enough for the best houses and cheap enough for ordinary use. A service of queen's ware consisting of 146 pieces sold wholesale for £3 17s., or about \$19.25. The queen's ware dinner service ordered by Catherine the Great, containing 952 pieces, cost previous to decoration £51 8s. 4d. The painting and enameling of the borders and views (each piece was decorated with a view of "some remarkable place") cost more than £2,200. In 1767 Wedgwood wrote of his product, "The demand for this said Cream Colour, alias Queen's ware, still increases. It is really amazing how rapidly the use of it has spread over the whole globe." Quantity production in the Wedgwood works and immediate imitation by other potters made it possible for the middle classes at least to substitute earthenware

dishes for wooden trenchers and pewter platters on their tables. Wedgwood's ware, moreover, was carefully designed, following the lines of the best china or silver services. The lids fitted, the cups stood squarely on their bases, and the plates stacked accurately. Sets of queen's ware intended for the nobility were painted by hand; those for ordinary sale were decorated by the new art of transfer printing which John Sadler, of Sadler and Green of Liverpool, invented in 1752. The dishes made by Wedgwood at Burslem were taken to Sadler and Green's works at Liverpool to be printed and were then returned to the Wedgwood works for their final firing.

From an early date Wedgwood felt the inconveniences attending the carriage of his fragile wares in panniers on the backs of horses through the "hollow ways" which alone served Staffordshire and which were virtually closed to traffic in wet and wintry weather. He took an active interest in securing a turnpike road to Burslem. A little later, after the success of the Duke of Bridgewater's canal, he joined a group of prominent men in Staffordshire in promoting the Grand Trunk Canal, linking the Trent and Mersey. He became treasurer of the Grand Trunk Canal Company, and he turned the first spadeful of earth when the construction of the canal began. The new canal not only made it easier, cheaper, and safer to carry his delicate tea cups, vases, portrait busts, and bas-reliefs to market, whether at Hull, Liverpool, or London, but gave easy carriage from Cornwall, Devon, and the North for the bulky clay and coal used in the process of manufacture. Along the banks of the canal, about two miles out of Burslem, Wedgwood purchased a large tract of ground and here he erected model works, complete from kilns and workshops to cottages for his workers and a mansion house for himself. This new establishment he named Etruria, in honor of the ancient Etruscans; and here on June 13, 1769, on the day the plant was formally opened, he personally threw six vases of black Basalt painted in red tones, which were stamped, *Artes Etruriae Renascuntur*. To this day Wedgwood pottery is made at Etruria, and the stamp on the queen's ware is *Wedgwood, Etruria*.

The inscription on Wedgwood's monument in the churchyard at Stoke sums up his work in saying that he "converted a rude and inconsiderable manufactory into an elegant art and an important part of national commerce." He started with a legacy of £20

from his father. At his death in 1795 he left a fortune of more than £500,000 in addition to his large business employing many people. Many other potters, following his methods, had built up large establishments also, so that Burslem and the country around it, which had been a poor, sparsely settled region in 1740, was one of the busiest and most thriving centers in England. In 1710 it is said there were 43 potters turning out wares worth £140 a week. In 1762 there were 150 separate potteries, employing nearly 7000 people, exporting their wares to Europe, the West Indies, and America. In 1769 Arthur Young declared there were 300 firms, employing 20 hands on an average. Wedgwood himself estimated the total product of the potteries at £300,000 annually in 1785. Some 15,000 to 20,000 men were employed. The average plant used 10 tons of coal a week at that time, with a production of £5,000 worth of wares per year. For the first six months of 1798 Wedgwood sold £9,761 worth of useful wares which cost him, including £3,067 for wages, £7,706 to make. The profit on the ornamental wares during the same period was £895. The profit in the London warehouses was £1,269. Out of total profits for these six months of £4,294 Wedgwood cannily wrote off £372 because "the increase of stock is too big" and set aside a sum for reserves. The useful wares branch employed (in 1790) 160 persons; the ornamental wares, 110.

Cotton

The two industries of cast iron and pottery just considered have a number of characteristics in common. They were both marked by volume production, which increased with great rapidity, sometimes doubling in ten years. The direction of operations was in the hands of dynamic and daring innovators, who experimented with new techniques, took heavy risks, and made great profits which were for the most part put back into improving the plant or were made available for providing better transportation. The new captains of industry scrapped old methods, built new factories, and strove to turn out a good product at a low price. Their achievement was not the mere adaptation of an old industry to new conditions, but the introduction of new products made in new centers, in new plants, by new processes.

The technological innovations in both the iron and the pot-

tery trades show a common feature in the reduction of the different steps in production to a routine. This factor is even more marked in the trade of cotton spinning, where the simplicity of the routine in certain operations made it possible to supplant human skill by machinery at a comparatively early date.

Europeans became acquainted with the value and attractiveness of cotton cloth during the seventeenth century, and their wants were supplied both through importing cotton cloth and cotton yarn from the East and through manufacture in various centers in Switzerland, Germany, France, and England. During the eighteenth century the industry made rapid strides and, as already noted, English-made wares were being sold in competition with East Indian goods both in Africa and the West Indies. At home cotton cloth was used more and more for servants' gowns, for draperies, furniture coverings, tickings, and other purposes. Cotton yarn was also adapted to knitting; and a very large trade presently grew up in knitwares, such as stockings.

The main center of the English cotton cloth industry was established in Lancashire and Cheshire, where the dampness of the climate tended to eliminate the static electricity which was generated in dry districts in the fibers and made the material hard to work. Knit goods were made in Nottingham from yarns spun in Lancashire or India. Spinning cotton yarn was, generally speaking, done by workers in their own cottages spread over the countryside; and as the use of English-made cotton increased it became more and more difficult to find, in the sparsely populated reaches of Lancashire, additional spinners to turn out sufficient yarn.

The scarcity of spinners was acute by 1760; but, even before it could have been apparent, inventors were busy with the idea of performing the comparatively simple motions of spinning by machinery. As early as 1678 Richard Dereham and Richard Haines patented a device to turn from six to a hundred spindles at a time, so that the spinners would be left free to do nothing but draw the thread.

The first approach to a successful solution of the problem of inventing a spinning machine was the work of Lewis Paul and his associate John Wyatt, who patented a spinning machine in 1738, after five years of experimental work. Although intended to spin wool, the machine actually was never used to spin anything but cotton. In 1740 a machine was set up in London, and

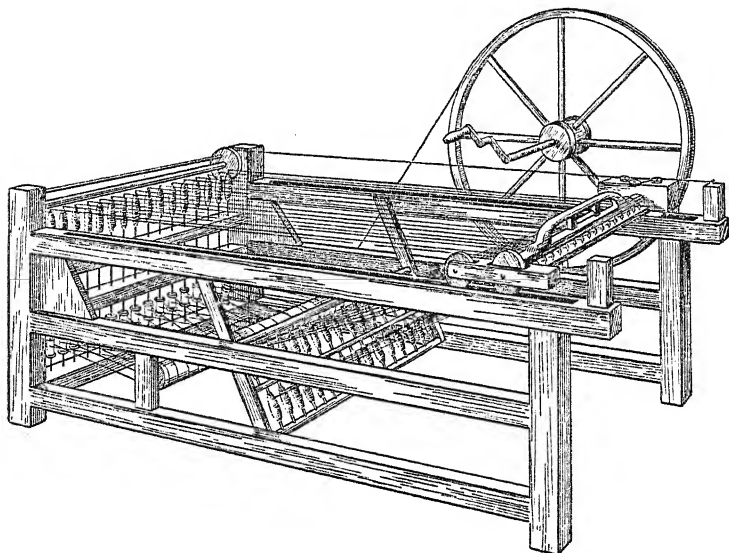
in 1741 another machine was set up in a warehouse in Birmingham. It was driven by "two asses walking around an axis." By 1743 the Birmingham mill was almost derelict, but Mr. Cave, the editor of the *Gentleman's Magazine*, who had sunk a good deal of money in the invention, persisted in the hope of doing something with it. He proceeded to start another mill in Northampton, where the spinning machine was worked by water power, and over fifty carders, spinners, and "supernumerary girls" were employed. Between 1744 and 1748 still another mill using a Paul spinning machine was set up in Leominster. This mill was burned down in 1754; and the Northampton mill, after losing money for its various owners, was closed either in 1759 or 1764.

Paul's machine was a failure, not because it was impossible to get sufficient capital to equip a mill or because it was hard to sell the yarn, but because the machine was imperfect mechanically and could not be run without great expense for repairs. Paul had made improvements and he had patented a mechanical carder to be used along with the new spinning machine, but his death in 1759 ended the hope of success. In this year the Society of Arts began to offer rewards for improvements in the old-fashioned spinning wheels and other premiums for a machine which would spin six threads of wool, cotton, linen, or silk at once. The second prize was soon given up since the experts were agreed that nothing was to be hoped for in the way of a spinning machine. It is said that £60,000 or £70,000 had been spent in perfecting the Paul-Wyatt machine before it was wholly laid aside as unprofitable.

Between 1745 and 1760 three other spinning machines were invented in England. One of these is said to have been destroyed by its maker because he was afraid that it might take bread out of the mouths of the poor. In France likewise the inventors were busy, but none of these inventions, either in England or France, was destined to be of practical use.

Between 1764 and 1767 James Hargreaves, a weaver in Lancashire, invented another spinning machine, known as the spinning jenny, which was a success. He seems to have made only a few of the machines, which were small and adapted to use in the workers' own cottages, before he left Lancashire and removed to Nottingham. The accounts of the reasons for his migration are confused. It is clear that his cottage near Blackburn was attacked by a mob intent on destroying his machine which "would

take the bread from the poor and throw them out of employment." But it is possible also that the heavy demand for yarn among the knitters in Nottingham seemed to offer a better chance of making a fortune out of the new invention. Lancashire folk pirated the new invention and, in spite of occasional riots, the use of the jenny in cottages spread rapidly. Actually, the jenny gave a new lease of life to the domestic system and enabled it for



The Spinning Jenny

another decade to meet the yarn requirements of the Lancashire weaving industry.

Hargreaves patented the jenny in 1770. His efforts to prevent infringements of his patent were resisted by the Manchester manufacturers, and Hargreaves eventually abandoned his rights. In Nottingham he had started a small factory for spinning yarn on the new machine. He seems also to have made jennies for sale to other manufacturers. In spite of the legend which grew up to the effect that Hargreaves died in obscurity and great distress, his factory was fairly prosperous, and Hargreaves is said to have been worth £7,000.

At the same time that Hargreaves was working on the jenny, a reedmaker named Thomas Highs of Leigh was experimenting

with another type of spinning machine employing the principles used in Paul's patent of 1738. Highs was assisted in constructing a working model of his invention by a Warrington clock-maker named Kay. Kay seems to have passed on the secret of the machine which he was constructing to Richard Arkwright.

Arkwright, originally apprenticed to a barber, had already invented a hair dye and during the 1760's was engaged in the business of traveling among the hair fairs of the English countryside to buy hair for use in making wigs, then so fashionable. It was possibly while he was on his rounds that he learned of Highs' work.

To exploit the new machine Arkwright entered into partnership with John Smalley, a liquor merchant and painter of his native town of Preston. There in a room in the Free Grammar School, early in 1768 a machine embodying Highs' ideas was set up, and by June, 1768, Arkwright had applied for a patent. Like Hargreaves, Arkwright soon moved to Nottingham. Arkwright later ascribed his removal to fear of sharing the treatment handed out by the Blackburn mob to Hargreaves. Another factor in Arkwright's migration may be the circumstance that while additional capital could not be found in Lancashire, the Nottingham hosiery knitting firm of Samuel Need and Jedidiah Strutt, seeing the possibilities of cheaper and more abundant yarn for their trade, agreed to finance the invention.

The new water frame, as Arkwright's machine was called, was set up in a small mill in Nottingham, and in 1771 a second mill, driven by water power, was started at Cromford. The first yarn that was spun was intended to be used in the knitting of hosiery. Before long Arkwright began experimenting with yarns which could be used for weaving both cotton velvet or corduroy and calico. He succeeded in making yarn which was hard and strong, suitable for the warp, the lengthwise threads, of cotton cloth, for which linen had generally been used in the past.

When the Lancashire weavers refused to use the mill-spun yarn, Arkwright and his partners decided to weave calico themselves. Since the new cloth was made of pure cotton, it was charged with an excise duty of 6d. a yard, and actually, under the strict interpretation of the act of 1721, it was subject to confiscation. When a letter in a Manchester paper actually suggested this course, Arkwright and Company successfully appealed to Parliament for re-

lief both from the excise and from the danger of the prohibition of the manufacture of a pure cotton cloth.

Cotton yarn suitable for use as warp was really a new material. One way of producing yarns of this type had been introduced by Arkwright. When he and his partners found themselves faced by competition from jenny-spun yarns, they decided to control jenny-spinning, to protect their own interests by setting up a monopoly of producing machine-spun warp yarns. They saw the opportunity which they required in the fact that before cotton could be spun on the jenny, it had to undergo a preliminary operation known as carding.

Lewis Paul had patented a carding machine in 1748, and in the same year another carding machine patent was issued to Daniel Bourn. Neither of the two machines was really successful; but the principles embodied in them were adopted in making various kinds of carding machines in Lancashire in the early 1770's. Arkwright saw the significance of the new carding machine for his scheme of controlling the output of warp yarn. If he controlled carding by machinery he could dominate the entire machine-spun yarn industry. In 1775 Arkwright secured a patent for a carding machine, on the basis of a very loosely worded set of specifications, and six years later he began to enforce a monopoly of the carding machine by suing spinners who were using it. Although he won his first suit and compelled three spinners to agree to pay costs and surrender their machinery, in 1781 and finally in 1785 the King's Bench Court disallowed his patent.

The instinct which led Arkwright to try to secure control of the carding machine was a sound one, since it was almost as essential an element as the water frame itself in the new technique of cotton spinning by machinery. Between 1774 and 1780, while Arkwright factories were being built in considerable numbers either to be worked by Arkwright himself or under his license, there were also large numbers of other cotton spinning factories set up, based on the carding machine and spinning jenny. Though the final disallowance of Arkwright's patent in 1785 ended the hope of a monopoly of cotton warp production, the Arkwright firm continued to hold a leading place in the industry.

Some notion of the scope of the operations of the Arkwright business may be gained from a survey of its early operations. By 1774 Arkwright and his partners had already spent £13,000 on the

Nottingham and Cromford mills and were employing 600 persons, mostly children. In 1775 or 1776 mills were erected at Belper and Milford near Cromford. In 1777 the Arkwrights returned to Lancashire and leased a mill at Birkacre near Chorley. In 1780-1781 they built a large mill in Manchester itself. By 1782 their expenditures were put at £30,000 for buildings, besides £4,000 on the Manchester factory.

At the same time the firm built and equipped mills for licensees at the rate of £7,000 for every 1000 spindles. By 1780, including the mills in their own operations, the partners had erected 15 or 20 of their "machines" with 30,000 spindles, each spindle capable of spinning 12 hanks of 24's count yarn a week, in Lancashire, Derbyshire, Yorkshire, Nottinghamshire, Denbighshire, and Cheshire. One mill contained 300 windows. The outlay in building mills for licensees was estimated at £60,000.

The yarn spun by Arkwright was coarse and strong. Fine muslin and cambric were still the monopoly of India, since no European could spin yarn fine enough to be used in their manufacture. In 1779 Samuel Crompton finished the invention of the muslin wheel or "mule," and in the next year he began to spin such extremely fine yarn that he was "beset on every side." The mule was a new spinning machine that "produced and increased," as Crompton himself said, "one of the first manufacturies in Europe, viz., the fine Muslin and Cambric." Crompton made public his invention toward the end of 1780; and within two years Samuel Oldknow, a young partner in a draper's shop who in 1781 had determined to make his fortune as a manufacturer of fustians and heavy cotton goods at Anderton, had begun to make muslins. During the first months of muslin manufacture the new goods were disposed of in Nottingham and Manchester; but early in 1783 Oldknow, seeing the greater possibilities afforded by a London market, entered into relations with two London firms to take two-thirds of his output between them. These two firms permitted drafts to a limited extent to be made on themselves to enable Oldknow to build up his business. But Oldknow, desirous of still more rapid expansion to enable him to meet the demand for his fine cottons, soon entered into an agreement with Richard Arkwright for a loan of £3,000 at 5 per cent to enable Oldknow to build a new factory at Stockport. Within half a dozen years Oldknow, like others who went into the new manufacture,

amassed a great fortune. This, incidentally, he was to lose in the later years of his life because he tried to combine the role of cotton spinner with that of community builder and social reformer.

The Steam Engine

In the new way of living that is known as the Industrial Revolution the essential element was man's enhanced control over the forces of nature. Emphasis has already been placed upon the development of new techniques in agriculture to increase the food supply, the lessening of the obstacles of distance by improvements in land and sea transportation and communication, and the cheap manufacture of new commodities which added to the amenities of existence. Men still had to rely too much upon their own muscles for getting their work done to realize to the full the potentialities of their inventions and discoveries. Human energy was now to be supplemented by the development of cheap mechanical power.

In 1777 Arkwright made inquiries of the firm of Boulton and Watt for a steam engine to raise water for the water wheels at the Cromford mill. When the mill had been completed the miners there had "lett down his water so that it cannot move." Matthew Boulton at his new hardware works at Soho outside Birmingham depended upon the water of the Hockley Brook to drive his hammers. The stream was feeble and in danger of failing altogether in dry seasons. He was early interested in the steam engine to provide more dependable power. In 1781 the proprietor of a copper rolling mill wrote that the water wheel was frozen, the works were shut down, and the laborers must freeze. Five years later Boulton noted that there was not a water wheel working in Staffordshire. All were frozen.

These illustrations indicate a twofold problem which faced the rapidly developing new machine industries of the later eighteenth century. So great was the volume of materials handled that human energy no longer sufficed to provide adequate power. The water wheel was undependable as a source of the needed substitute. Moreover, water power was available only at the falls of a river and not where it was wanted. The answer was, of course, some form of mechanical prime motor or engine, which could

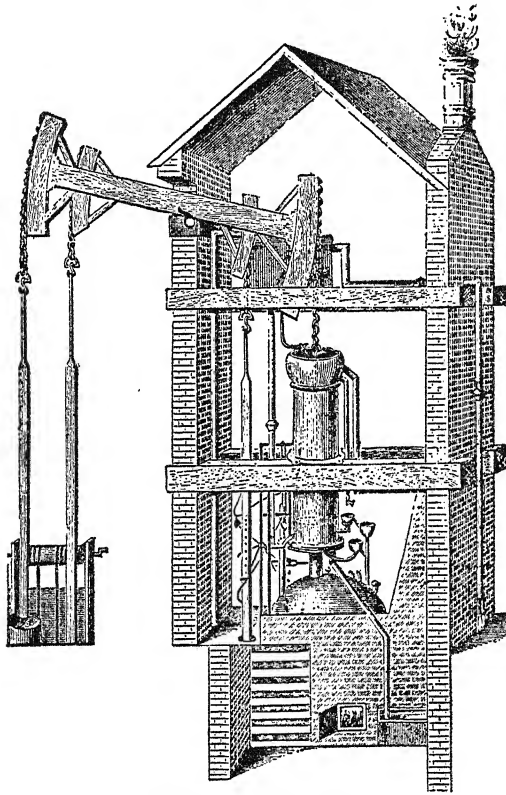
supply any amount of power at any time, in any place. The construction of such a motor had excited the interest of men of science and inventors as early as the second half of the previous century. The Marquess of Worcester's fire engine has already been described in an earlier chapter.

The earlier interest in a prime motor grew out of the two problems of keeping the deeper mine levels of the day clear of water and of pumping water through city water mains. In 1698 Captain Thomas Savary, using the suggestions of a number of his predecessors in the field, had brought out a curious combination of bulbs, pipes, and valves designed to use a vacuum created by condensing steam in the bulbs to pump water. Savary called his device "The Miners Friend," and described it as an engine for raising water and setting in motion all sorts of mills through the driving force of fire, which would have great value for freeing mines of water, the provision of cities with water, and driving mills, insofar as these were not provided with water power and constant and steady wind. "The Miners Friend" was never a practical success, what with danger of explosion, inefficiency, and the prohibitive amount of coal burned under its boilers. Small models are said to have been used for fountains and baths in gentlemen's homes and gardens.

In 1711 Thomas Newcomen made certain major changes in the Savary engine, such as the substitution of a cylinder fitted with a piston, in place of the bulbs as the chamber in which the steam was condensed, and the use of a pump actuated by the movement of the piston to raise the water. When the steam in the cylinder was condensed by jets of cold water sprayed on the outside, the resultant vacuum permitted the outside air pressure to force down the piston and actuate the pump. In the later improved models of the Newcomen engine the piston made twenty or twenty-five strokes a minute; and an engine with a cylinder 6 feet in diameter and 7 or 8 feet long, burning 13 tons of coal a day under its boilers, developed perhaps 75 horsepower.

In spite of their cost, Newcomen engines were used in different parts of England during the eighteenth century, chiefly in connection with coal and tin mines and in city water works. In 1775 there were 130 Newcomen engines in operation in England, of which 70 were located in coal mines, 30 in tin mines, and 10 in London water works. At the Darby iron works at Coalbrookdale

where many of the cast-iron cylinders of the Newcomen engines were cast, five Newcomen engines were used to pump water into the high level reservoirs from which it fell over the water wheels driving the air pumps for the blast furnaces.



The Newcomen Engine

The high coal consumption of the Newcomen engine made it impracticable to install such an engine except where coal was very cheap and easily available. In view of the difficulties of transport at the time, this meant in places near coal mines. In 1763 a model Newcomen engine, used for experimental purposes at the University of Glasgow, was brought for repair to James Watt (1734-1819), mathematical instrument-maker of the university. He was a man of some scientific attainments as well as a highly skilled mechanician.

Through his knowledge of the recent work of Dr. Black on the subject of latent heat Watt recognized that the inefficiency of the engine lay in the alternate heating and cooling of the cylinder, by which five-sixths of the energy of the steam was wasted. How could a vacuum be created in the cylinder without cooling it? Two years later, while on a walk on a Sabbath afternoon, the idea entered Watt's head that as steam was an elastic body it would rush into a vacuum outside the cylinder, and if a connection were made between the cylinder and an exhausting vessel, the steam would rush into it and might be condensed without cooling the cylinder.

Watt really had set out merely to improve the Newcomen engine, in which the force of atmospheric pressure drove down a piston head into a cylinder in which steam had been used to create a vacuum. Ultimately, however, he applied steam to both sides of the piston head and drove the piston alternately up and down by the expansion and exhaustion of steam in the upper and lower chambers of the cylinder. Thus he worked out the true steam engine.

The manufacture of small models embodying Watt's new ideas was not difficult; and in 1769 he secured a patent on his new engine. But the erection of a full-sized working engine was a task of a different order of magnitude. Watt's own resources were entirely inadequate for the undertaking. Dr. Black, the professor who had discovered latent heat, advanced Watt £1,200 to enable him to continue his experiments, and then brought him to the notice of Dr. Roebuck, who had recently founded the Carron Iron Works in Scotland. Roebuck was having trouble with water in his iron mines, and the Newcomen engine which he had installed was insufficient. He saw the possibilities of Watt's engine and arranged that he was to pay all costs of future experiments and receive a two-thirds share in the invention. Watt set about building an engine with an 18-inch cylinder and a five-foot stroke.

The panic of 1772 found Roebuck hard pressed financially, and he was forced to sell his interest in the new engine to a Birmingham hardware manufacturer, Matthew Boulton, for the remission of a debt of £630 and the promise of £1,000 out of the first profits of the engine.

For several generations Boulton's family had been making silverware, inlaid steel shoebuckles, buttons, guns, and any other articles

made from gold, silver, copper, steel, platina, or tortoise shell that they could sell. Matthew Boulton had inherited the business, married an heiress, and had transferred the works from a great number of little houses in Birmingham to Soho, on Hockley Brook outside the town. Business increased so rapidly that the little brook could no longer furnish adequate power to work the great hammers. It was the need for greater and more dependable power that had interested Boulton in Watt's work; and now that Roebuck could no longer back it, Boulton took it over. The parts of the engine were brought from Scotland to London by sea, and transported thence overland to Birmingham.

At Soho Watt continued to meet difficulties. It was hard to find workmen with sufficient skill to make precision-fitting parts. Above all, as failure after failure was encountered, it seemed to be impossible to get a perfectly true cylinder. Those which were made were out of round or they tapered or bulged. It was not until John Wilkinson, the ironmaster, undertook to bore a cylinder on his new cannon-boring machine that sufficient accuracy was attained. Finally in 1775, after the expenditure by Boulton of £2,200, the first Watt engine was finished and installed at Soho to pump water to drive the works. Watt obtained an extension of his patent until 1800, and he and Boulton entered partnership to build engines. The first engine put on the market went to Wilkinson's iron works at Broseley. It cost £2,000 to erect. Another engine was set up in a colliery in Stafford, and a third in a distillery.

The steam engine was still conceived of as essentially a machine to be attached to a pump. Some engines were sold to foundries, collieries, and other industrial plants where pumping engines could be used. The deep levels of the Cornish tin mines, where pumping was the major problem, seemed to the partners to be their mainstay and hope. After concentrating their attention on Cornwall for five or six years, Boulton and Watt concluded that if they ever expected to make any money they must find new outlets for their engine. When they installed the first engines, Boulton and Watt asked that the purchaser pay the cost of materials and installation plus an annual sum representing part of the savings over a Newcomen engine. The mine owners seem to have resorted to every trick to evade payments, and much of what they did pay was in the form of shares of stock in the mining companies, which

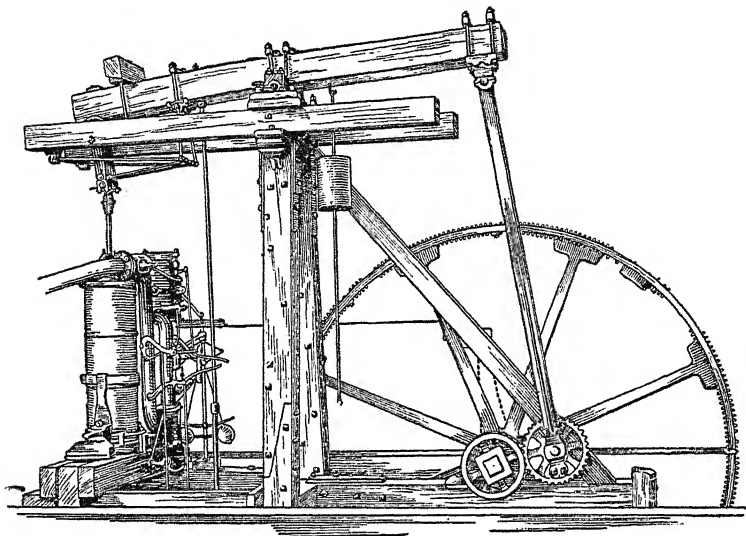
were not any too sound. It is said that out of payments of £9,878 due them to the end of 1782, Boulton and Watt received only £3,724.

From the first Boulton had thought of the steam engine as a source of rotative power applicable at any point to any extent. For several years he had been trying to get Watt to effect further inventions which would make it possible to use a steam engine directly to drive a machine. Thus in 1781 Boulton wrote to Watt, "The people in London, Manchester, and Birmingham are *steam mill mad*. I don't mean to hurry you but I think . . . we should determine to take out a patent for certain methods of producing rotative motion from . . . the fire engine." In another letter he wrote, "There is no other Cornwall to be found and the most likely line for the consumption of our engines is the application of them to mills which is certainly an extensive field." Watt thus took in hand the problem of separating the pump from the steam engine and of adapting it to drive machinery. In 1782 he patented a device known as the sun and planet motion, intended to transform the up-and-down or reciprocating motion of the piston into a rotary motion. A simple method of doing this is, of course, the crank and piston rod, used today in connection with every automobile engine. Watt used the more cumbersome method of the sun and planet motion in order to avoid infringing on a patent held by a man named Pickard.

Another great invention of this period of Watt's career was the parallel motion. In the single-acting engine the piston rod was connected with the beam by a chain, but when steam was applied to both sides of the piston head, and the engine worked not only to pull the beam down but to thrust it upward, the chain had to be replaced by a solid connection. The problems involved here were so difficult that Watt considered his solution of them in his parallel motion the greatest of his inventions.

Boulton's reliance, in his hope of introducing the steam engine into industry as a source of direct motive power for machinery, was upon the flour-milling business. Actually a steam corn mill, the Albion Steam Corn Mill, was built, and two steam engines of 17 horsepower each were set up for grinding grain. The real prosperity of Boulton and Watt and the significant use of the steam engine lay neither in tin mines or other pumping installation nor yet in corn mills, but in the factory. In the potteries the heavy

work of grinding the flints was often done by water power. After 1775 a certain John Turner visited Cornwall in company with Josiah Wedgwood in connection with a matter relating to china clay. Turner was so impressed with the Newcomen engines which he saw there that he purchased one and had it set up in his works at Stoke "to raise water to work a wheel" for grinding flints. Mr. Spode purchased Turner's plant, and his success with the engine



The Watt "Lap" Engine of 1788

interested Wedgwood. Watt was brought to the Potteries to survey Spode's flint-mill (either in 1781 or 1782), and after his visit Wedgwood ordered a Watt steam engine for his Etruria factory. He ordered a second in 1784, and a third, of 10 horsepower, in 1793. He expected to use engines to grind flint, to grind enamel colors, to operate a sagger crusher, and to temper or mix clays. Incidentally, Wedgwood's son purchased for the Etruria works in 1801 a 30-horsepower engine which was still working in 1912 when it was dismantled and sold for scrap. Etruria was the first factory to use a steam engine, and its introduction sounded the knell of the small workshop in the pottery trades as in all other fields into which it entered.

In 1781 Boulton made a model of a small copper rolling mill as a suggestion to a copper mill owner that he buy a steam engine

to drive his mill. Wilkinson saw the model and at once ordered a steam engine for his Bradley works and another for Rotherham. Even more important was the introduction of the steam engine into the cotton mill. In 1785 Richard Arkwright, after a good deal of bitter comment, purchased a steam engine for one of his great spinning factories. In the next ten years 47 engines of 736 horsepower were sold for use in cotton mills, and 35 more before the end of 1800.

Between 1775 and 1800 a total of 496 Watt engines with about 7500 horsepower were built. A 10-horsepower engine with an iron boiler cost £491 in 1800. It had a cylinder 17½ inches in diameter and burned one bushel of coal per hour.

The year 1800 was the date of the expiration of Watt's patent. Since building by other firms than Boulton and Watt began in 1801 it is impossible to give exact figures for the output of steam engines in later years. Yet it is certain that production went ahead rapidly. It was between 1801 and 1804, for example, that steam generally replaced water power in the cotton spinning mills. By 1815 England may well have had several thousand steam engines in operation. France, in that year, had 15 engines of 230 horsepower. One of the great advantages which England had over France in industrial matters in 1815 was the installation in England of a much larger number of steam engines, which made possible the use of heavier machinery in larger factories.

The steam engine made available cheap and practically unlimited power at any place where it might be wanted. It made it possible to remove mills from inaccessible and isolated locations at the falls of rivers to the towns where markets, the means of transport, and aggregations of workers and consumers were already in existence. The steam engine, moreover, made industry for the future not merely a capitalistic undertaking, but an enterprise in which very large capitals were necessary, since the steam engine called for a costly plant and heavy machinery.

Yet it must not be imagined that the whole of British industry was immediately transformed, or even seriously affected, by the new steam engine. For fifty years after its introduction its use was extremely limited, being scarcely used except in mines, cotton factories, blast furnaces, rolling mills, and pottery works, and in the new steamboats. Even in these undertakings the number of installations was still small.

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Chapter 20

THE SOCIAL REACTIONS OF THE CHANGES IN INDUSTRY, 1770-1815

SOMEWHERE in the 1770's and 1780's the various features which have been discussed above, such as the introduction of new goods, the improvements in transportation, the opening of new markets at home and abroad, the progress of invention, and the building of mills and factories equipped with costly machinery and driven by water power and even by the steam engine—all these features began to merge with each other to create a new way of living and thinking or, as the sociologists say, to form a new social pattern. Industry definitely began to challenge the place of agriculture as the dominant activity in English economic life; the town began to vie with the country; and beside the older social hierarchy of agricultural laborer, farmer, and landlord we find a new social grouping of mine and factory workers and entrepreneur owners. In addition there were all the subsidiary new classes, such as the navvies who built the canals, the bargemen and haulers, the commercial travelers, and the host of intermediaries concerned with selling the products which the mines and mills turned out.

The New Social Order

The new machinery, the steam engine, and the new ways of making things which have just been discussed are sometimes spoken of as having solved the problem of production. Actually they did nothing of the kind, but rather they introduced certain products in greater abundance for the service of human beings. Some of these products, such as Wedgwood's new dishes, actually

created a new desire rather than satisfying an old demand; for ordinary men of the seventeenth century certainly never even thought of eating from anything like the beautiful cream ware which the potteries turned out in such quantity. In sum, the new industrial developments provided a more abundant supply of certain goods, which when taken together with the increased production of food of the time formed the material basis for a new way of living quite different from the way of living as practiced in the past.

In this new society the dominant figures were the factory-owners. Dr. Gaskell, a writer of the early nineteenth century, looking back on the immediate past said that many of the first successful manufacturers were men who had their origin in the ranks of mere operatives or were sprung from the extinct class of yeomen. Some big men were not. They were all persons of quick views and great energy of character; but many were also men of very limited general information, who saw and knew little of anything beyond the demand for their cloth or other wares, and the speediest and best modes for their production. In the hurly-burly of everyday business they saw that if they were to prosper they would have to make the best materials at the lowest price. In that task in which they had to succeed or go bankrupt they were confronted by all sorts of problems, such as those of the best places to buy raw materials, the enlistment of workers, their training and discipline, the provision of capital and credit, and above all the getting of a constant stream of orders to keep their plants busy. Naturally they felt that they needed elbow room to deal with these things. They resented interference in the way they ran their business, and they felt that they could tolerate no slackness on the part of their employees. They often acted like slave drivers, squeezing out of their workers the last ounce of their effort. But they also worked like slaves themselves.

For their harshness and severity they have often been blamed. Yet it must be recognized that they were not remote from their workpeople like a modern impersonal corporation. Many of them knew all their workers personally and were on terms of friendly intimacy with them. Some of the new industrialists, such as Wedgwood, Watt, Huntsman, and Boulton, were men of culture in its truest sense and did more to advance art and science in their

day than did the professional practitioners of these disciplines in the universities.

Yet if the new manufacturers insisted to the limit on their absolute ownership and control of their fine new factories, there was among them very generally a real sense of responsibility about the wealth which they accumulated. It was theirs; theirs to manage, to enlarge, to invest; but not theirs to consume. Money and wealth were entrusted to them to be put back into the business, not to be spent. Perhaps they sensed that they were "deferring" present enjoyment in order to build up more adequately the necessary equipment which would in the future provide satisfaction for all. In any case there is no question but that their accumulations were not spent on themselves but went back to society in the form of bigger factories which might in the time to come make possible all that people dream of, such as short hours, ideal working conditions, and the noble use of leisure. In the early days of their business the brothers Walker, among the greatest of the ironmasters, allowed themselves only 10 shillings a week each for the maintenance of their families. Even as late as 1760, nineteen years after they began operations, only £140 was divided among the four partners (about \$175 each). Samuel Garbett, with great holdings in the Carron Works and in many other enterprises, allowed himself in his household but one maid and one blind man-servant. The partners of the great Phoenix Foundry received salaries for their work in the various departments of the firm. From 1799 to 1811 one of the partners, George Newton, received £80 a year. In 1812 his pay was raised to £200 a year, but four years later, in view of the depression, it was again reduced to £80. In addition each partner received 5 per cent on his capital. All the rest of the earnings were put back into the business.

In view of some of the theories of the origins of modern industrial capital these examples are interesting. Men who were successful in manufacturing seldom had any capital to start with. Huntsman was the son of a German immigrant. Watt's people were small Scottish farmers. Crawshay, the ironmaster, was the son of a small farmer. Dr. Roebuck's father was a cutlery maker. Many of them started with only a few pounds, but by dint of unceasing exertions and frugality they accumulated larger and larger fortunes which were invested in ever better factories and machinery.

Among the new "lords of industry" there was from the beginning a good deal of consciousness of identity of interests and a great amount of cooperation. Many of the leading iron-making families were united by marriage, and as early as 1762 Abraham Darby and the Wilkinsons entered into an arrangement with each other for uniform prices for their products in all markets except London. This developed into a permanent association of all the ironmasters of the Midland district for price agreements and for other purposes. Similar associations seem to have grown up in other industries, and in 1783 common action began between various trade groups to represent the interests of the manufacturers as a whole before the government. This new organization, known as the Chamber of Manufacturers, was at first concerned with taxation, in regard to which it urged that taxes might well be levied on the products and property created by manufacturing but not on manufacturing itself. Later it took a hand in the government's trade policy, successfully defeating a commercial treaty with Ireland in 1785 and working for a new trade treaty with France in 1786. The Chamber was willing to use the power of the state against the workers, as when in 1782 it secured a vicious law against workers who broke tools; but it vigorously resisted any government "interference" in industry. Through the Chamber the industrialists felt that they had such direct access to the responsible officials of the government that they disdained to interest themselves in party politics. It was only after 1815, when the interests of industry seemed to be sacrificed to those of agriculture through the enactment of a new Corn Law, that real attention by the industrial classes to politics began.

The Workers in Industry

It became apparent almost immediately that the changed ways of living were not all gain for the workers or for society as a whole. The industrial workers of the past frequently had had a foot in the country and in times of depression could fall back on little garden plots on the outskirts of town or even go back to their relations who were still down on the farms. The new aggregations of "hands" working in a cotton mill, in a blast furnace, or in a pottery works were completely cut off from the soil. They were utterly dependent upon their weekly earnings; and a brief period

of unemployment due to an unfortunate peace, a change in fashions, a famine on the other side of the world, or stock exchange speculation on the continent left them utterly without resources. The factory thus created an urban proletariat with nothing between it and starvation except regular work.

Unfortunately for themselves and the society in which they lived, these workers were none too well prepared to face this new world in which they suddenly found themselves. In the first place they were recruited from contaminated sources, and often represented not the strongest but the weakest elements in the population.

The Sources of the New Factory Working Class

The first expansion of industry, even before the beginning of the eighteenth century, had resulted in an extension of the domestic system. Workers working in their own cottages, spread out over the countryside, received cotton for spinning, yarn for weaving, or iron to be made into nails from the traveling merchants who "put out" their materials to be manufactured. In the earliest days these cottage workers had a certain economic independence since they often had a garden plot and even owned their own tools. But, falling into debt to the merchant in times of poor trade, they often lost their tools and machines to him. Tied now to a certain merchant they were forced to accept what wage rates he offered; and to maintain their earnings they pressed their wives and children into service and gave up their by-employment in agriculture since this lessened their skill or took too much time. Isolated as they were from each other and from the ultimate market, the domestic workers of the eighteenth century handed on no tradition of high wages and comfortable living standards to their successors in the factories.

Worse still, in certain trades, particularly in the spinning of cotton, the first machines (which were too large to be installed in workers' cottages) were adapted by their simplicity and low height to be tended by children. Moreover, the first spinning mills were frequently "erected for the convenience of water power" at considerable distances from towns and villages, "from which alone an adequate supply of hands could be obtained." Hence "apprentices" of from six to twelve years of age were almost the only workers

in the first power spinning mills. These apprentices were easily procured from the parish workhouses of the large towns and transmitted in droves to the mills. It is said that Arkwright employed children almost entirely at first in his spinning mills, and Peel and Co. at one time employed a thousand such youngsters.

The demand for weavers in the vicinity of the spinning mills, especially after the invention of Crompton's mule, led to the growth of villages of domestic weavers around the spinning mills. The parents of children presently took advantage of their labor and "hence free laborers (children of the domestic workers) became superadded" and in time displaced the apprentices to a considerable extent.

The new blast furnaces and pottery works had employed adults from the first. As the machinery became larger and heavier in the spinning mills adults gradually found their way into them also. But where many children were employed the adults were in competition with the lower-paid children. If, moreover, women were employed along with men, the men soon discovered themselves in competition with the women.

Yet even in spite of all these circumstances, so great was the demand for workers in some of the new industrial centers that wage scales actually rose. This was particularly true in Manchester, Birmingham, and Etruria. The well-being of industrial workers in Lancashire was so superior to that of other groups that moralists felt called upon to denounce them for their extravagance, in that they "indulge upon many occasions with the wheaten loaf." Wedgwood was rather proud that the potteries had transformed a poverty-stricken region into a populous and prosperous district, "with the workmen earning near double their former wages, their homes mostly new and comfortable, and the lands, roads, and every other circumstance bearing evident marks of the most pleasing and rapid improvements."

Yet as the demand for laborers continued the employers went into the country districts of England and into Ireland to recruit workers. And here, unfortunately, they drew upon classes whose standards of living were unbelievably low. The whole idea of the farmers and landowners during the eighteenth century had been to pay the agricultural laborers just as low a wage as would support them "with frugality." These pittances had been eked out by a few cows on the commons, the cutting of wood, and food

and drink allowances; but the enclosure movement had cut off these extras and reduced these classes from whom the factory workers were to be taken to dire wretchedness. The "wild" Irish were, if anything, in a worse condition than were the English farm laborers.

It is one of the major tragedies of history that, at the very moment that the machine through its fecundity promised a better life for all, the wage scale of the new class of factory workers was determined by the evil standards of living in vogue among the workhouse children, poor domestic workers, and the degraded Irish and English agricultural laboring classes. The press of their inexhaustible numbers as they made their uncontrolled way into the new industry made it almost inevitable that they should overwhelm the slight gains made by the first factory workers.

A tradition of low living standards, a willingness to work for low wages on the part of countless thousands, and the absence of any social regulation of private initiative and profit are factors of the first importance in the evolution of the new England of the later eighteenth century. "The industrial worker," says Professor Bowden, "came from sources which were polluted." He labored, moreover, in an environment which was often degrading. Workmen found themselves replaced by their own children at an early age; and one contemporary writer actually charged that hence men married early in order to have children upon whose labor they would presently be forced to depend. Human material was used up rapidly. Men were old at forty, and at fifty they were often unable to work and came on the parish. The whole process represents a depreciation of the worth and dignity of human life.

The new factory introduced into the lives of the workers who entered it a new rigidity. Though hours were not longer than in the days of domestic work, there seemed to be no freedom any more. The "hand" was summoned by the factory bell, his daily life arranged by factory hours, and he worked under the constant eye of the foreman. A writer of the time, Bamford, in his *Early Days*, tells how in the times before the factory his uncle used to retire into his house every morning and afternoon to smoke a pipe. Felkin in his *History of Machine Wrought Hosiery* tells how a Nottingham stocking-maker used to take every other Saturday off for gardening. The pamphlet literature of the eighteenth century is full of laments over the inclination of the workers to work only

four or five days a week and spend the rest of the time getting drunk.

In contrast with this liberty of the past was the new factory discipline which inflicted fines for lateness, for absence from work, for burning the gaslights too long in the morning, for opening the window, and even for being heard whistling while at work. Working for twelve and a quarter to fourteen hours a day under this regimen was a strain upon a generation unused to it. To the feeling of being shut up in the factory was added the exhausting sense that the machine never tired. "Whilst the machine runs," said a contemporary pamphlet, "people must work—men, women, and children are yoked together with iron and steam. The animal machine . . . is chained fast to the iron machine which knows no suffering and no weariness." The earliest apologists for the factory were at special pains to deny that there was any basis for this psychosis. "Of all the common prejudices which exist with regard to factory labor there is none more unfounded than that which ascribes to it excessive tedium and irksomeness above other occupations owing to its being carried on in conjunction with the unceasing motion of the steam engine," declared Andrew Ure, an apologist for the new order.

The New Towns

The problems of social readjustment presented to thousands of persons just removed from the farm to work in the new factories were intensified by the ugly surroundings in which they had to live in the new towns. These were "not so much towns as barracks, not the refuge of a civilization, but the barracks of an industry." Sometimes the mine or factory owners built rows of houses for their operatives. In the best of these new communities, such as those built by the Gregs, the Ashtons, and the Strutts, there were schools, libraries, churches, swimming pools, and dance halls. The workers were better circumstanced than ever they had been before. But such places were rare. Often the manufacturer looked to his houses as a source of profit. One firm averaged a return of $13\frac{1}{2}$ per cent through its rents and also owned or rented the local shops which had to be patronized by the workers.

At worst, workers' houses provided by the manufacturer at

least had the merit of being near the factory and of being built with some consideration in view of the use to which they were to be put. It was far otherwise with the workers' quarters which arose in some of the old municipalities, such as Manchester, Leeds, and Sheffield. So rapid was the influx of workers that the civic authorities, even had they been alert, could scarcely have exercised any planned supervision over the structures that were built or converted to house the newcomers. It was rather a question of getting anything that would answer, that would house workers and would be cheap enough to suit their budgets. The result was the hasty construction, without regard to plan, amenities, or beauty, of whole sections of workers' dwellings. The only considerations were that the builders should make a profit and still could throw up structures which were not beyond the means of the workers. The results were terrible in their ugliness. Nassau Senior, an economist of the early nineteenth century, thus described parts of Manchester. "As I passed through the dwellings of the mill hands . . . I was amazed that it was possible to maintain a reasonable state of health in such homes. . . . A carpenter and a builder unite to buy a series of building sites and cover them with so-called houses. In one place we found a whole street following the course of a ditch, because in this way deeper cellars could be secured without the cost of digging—cellars not for storing wares or rubbish, but for dwellings of human beings. Not one house of this street escaped the cholera. In general the streets are unpaved with a dunghap or a ditch in the middle; the houses are built back to back without ventilation or drainage, and whole families are limited to a cellar or a garrett." The lack of drainage was not, however, confined to the workers' quarters of the new towns, nor was the absence of a public water supply. Actually it was not until after the middle of the nineteenth century that much attention was paid either to sewage disposal or to an uncontaminated supply of pure water in any English city. The so-called drains of earlier times were almost exclusively for the removal of storm water.

To make life in the towns even more depressing, the ancient commons and parks were often enclosed for building sites. In Manchester Dr. Hawkins spoke of the effect of the lack of green open spaces on public health. "It is impossible not to notice the total absence of public gardens, parks, and walks at Manches-

ter: it is scarcely in the power of the factory workman to taste the breath of nature or to look upon its verdure, and this defect is a strong impediment to convalescence from disease." A labor cry is almost poetical. "Have we not seen the commons of our fathers enclosed by insolent cupidity, our sports converted into crimes, our holidays into fast days? The green grass and the healthful hayfield are shut out from our path. The whistling of birds is not for us; our melody is the deafening noise of the engine."

Under such conditions, of course, the workers must seek a refuge from drabness, monotony, and weariness. Some of them found their escape in the Methodist Chapel, with its rich pageantry of the Old Testament. Others found it in the brightness of the beer shop and the forgetfulness of drunkenness. One can scarcely wonder at the characteristic slackening of inhibitions and the enormous amount of illicit sexual intercourse to which many observers bear testimony. The few formally organized amusements were very rough and coarse. Bull-baiting, cock-fighting, and "fighting up and down" with kicking every part of the body and throttling to the verge of death were watched by enormous crowds. Perhaps it is not the place for twentieth-century people to point the finger of scorn at even such amusements. There was with it all much kindness and real gentleness.

It was a fashion among contemporaries to speak of the "vicious and depraved lives" of the workers, and to sum them up as "ignorant and profligate." In extenuation of their conduct it must be remembered that many of the workers in the new industry were only one or two removes from the soil. Their fathers or grandfathers had been peasants or agricultural laborers, living under medieval conditions with outdoor work, outdoor sports, and a traditional morality which countenanced sexual relations between lovers before marriage. As they were swept into the towns the old traditional social restraints of neighborhood opinion were destroyed. The town workers were unattached, alone. Gone were their amusements, dances, seasonal celebrations, their home-brewed ale, their more or less wholesome food. They were out of joint with their new surroundings, and the town did nothing to educate them to the new ways of living in which they found themselves. Moreover, as far as their profligacy goes, who could have been terribly dissolute on fifteen shillings a week?

Trade Fluctuations

Mixed with so much unhappiness as there undoubtedly was among the new industrial working classes there was also a good deal of real happiness and even a sense of prosperity. In fact a closer study reveals that the expressions of distress come in waves, which are closely synchronous with the fluctuations in business activity.

Actually, from many points of view the worst feature in the life of the industrial worker was not monotony, drabness, miserable surroundings, or even wages lower than they might and should have been. The great evil was insecurity. A large population was entirely dependent upon stability in prices and business conditions. With wages keyed to low food prices, rising prices entailed a reduction of the working-class standard of living. Downward trends in business might reduce wages or cut them off altogether. Downward trends were of course not the rule, but represented a reaction to periods of expansion. For business did not run along steadily, but went in spurts. Periods of very rapid advance were followed by times of lessened activity and readjustment. In periods of good trade, each manufacturer sought to make all he could. He enlarged his plant, recruited new workers, and increased his output. Presently more was being made than the market would take. Orders stopped coming in, employment fell, wages were reduced, and the manufacturer, unable to meet the fixed charges he had assumed, such as interest on the money he had borrowed to enlarge his plant, fell into difficulties. A period of trade depression always resulted in many bankruptcies among the manufacturers; but its effects upon the workers were even more severe. Those hands for whom there was no work at all had little recourse but to suffer hunger and starvation until times improved. Divorced from the soil, the factory workers could not fall back upon their by-employments in farming as the domestic workers had done in the past.

Trade depressions were no new phenomena in European life. The ebb and flow of business activity seems inherent in any but an absolutely controlled economic system. But owing to the more rapid tempo of industrial change and the growing integration of European business activity, the trade depressions of the

later eighteenth century were both more intense and more widespread than those of earlier times. They were financial and commercial rather than industrial in cause, but their effects were severely felt in the industrial districts. As suffering and distress were intensified, various programs of alleviation were evolved among both the employers and the workers.

It is often said that the first trade depression of the newer sort, which affected many parts of Europe instead of merely one country, occurred in 1763. During the Seven Years' War (1756-1763) new markets in conquered territories, the manufacture of munitions of war for the British forces, and the sale of supplies to Frederick the Great, England's ally, led to greatly increased business activity. Exports rose from £10,500,000 in 1759 to £13,300,000 in 1761. Immediately after the preliminaries of peace had been arranged in 1762, great speculation in stocks and government securities began. Simultaneously with an intense demand for capital for commercial and colonial development, Europeans began to sell English securities. Money was "tight" and interest rates were increased. On the continent bankruptcies began, orders for English goods ceased, payments for goods already delivered were not met, and manufacturers found themselves unable to keep their men at work. Fortunately the Bank of England, by giving credits of £1,600,000, was able to tide businessmen over without numerous bankruptcies.

Actually the great development of English industry had scarcely begun at this time; and the small scale of business operations was perhaps a factor in the limited scope of this depression in England. Its effects soon disappeared and during the 1760's rapid expansion was undertaken to supply markets in the colonies newly acquired from France and elsewhere. By the early 1770's overproduction of certain goods had become evident. Consumption at home was reduced by high grain prices. What was happening was disclosed—even though contemporaries scarcely understood the significance of the revelation—when a Scottish banking house suspended payments, with a deficit of £150,000. This deficit, of course, represented, in the last analysis, the shrinkage of values due to overproduction, failure of consumption, and reduction of earning power.

The East India Company in particular was badly involved at this time. Ever since 1767 it had been extending its export trade

to the continent of Europe; and in anticipation of still further growth it had overstocked its continental warehouses. On March 1, 1771, it had £2,000,000 worth of goods on hand; a year later, £2,500,000 worth; and on December 1, 1772, £3,200,000 worth. In all there were 22,300,000 pounds of tea in storage which nobody wanted to buy. Meantime the company, to meet its bills, asked the British government for assistance to prevent further embarrassments.

Much the same concatenation of rapid expansion, overproduction in excess of demand, lowered prices, and distress is to be seen at this time in the Scottish linen industry, which before the rise of the cotton trade was of great importance. Production had to be cut from 13,400,000 yards to 10,700,000 yards. Many workers sought escape from wretchedness by emigration to America. A similar situation prevailed in the Irish linen industry.

In 1783 conditions similar to those of 1772 developed. There had been great expansion of trade, which was now followed by a diminution of sales. At this time a good part of the reduction of consumption in England itself was due to the bad harvest in England and the ensuing high food prices. Forced to pay more for their food, people had less with which to buy manufactured goods. Working people bore the dual burden of unemployment and high food prices.

The trade depressions of 1763, 1772, and 1783 were each followed by periods of rapid recovery and further advance. These recessions and advances were scarcely more than curtain raisers to the really serious ups and downs of business during the thirty years after 1790. Not only was the ebb and flow of business advance and retreat more rapid, but it was on a grander scale.

War and Trade, 1790-1815

A number of circumstances peculiar to these years must be given special attention. Up to 1790 England produced enough grain to feed herself, though since 1765 there had been some years of net importation of grain. On the average, however, about one-twentieth of the crop was exported and in good years one-eighth. Between 1789 and 1813 harvests were generally poor, with only five good years, 1791, 1796, 1798, 1801, and 1813. There were eleven or twelve years of deficiency, 1792, 1794, 1795, 1799,

1800, 1804, and 1807-1812 inclusive. The years 1793, 1797, 1802, 1803, 1805, and 1806 were years of bare average produce.

After 1807 there were years when foreign sources of supply were actually closed to England, and the scarcity was accentuated. High prices for grain were the rule. The scarcity of foodstuffs would have created difficulties even if other conditions had remained normal; but far from that, these years from 1789 to 1815 were among the most disturbed that England had ever seen. For in 1789 the French Revolution broke out, and four years later, in 1793, England joined the ranks of those nations at war with France for the purpose of protecting themselves from the corroding influence of the democratic idea. War continued, except for a brief period in 1802 and 1803, until 1815.

As a direct result of the methods used in financing the war the English currency was greatly inflated. Quantities of specie were sent abroad as subsidies to England's allies. Government expenditures were covered more largely by bond issues than by taxation, and these bonds were themselves made the basis for the issue of paper currency. Through this sort of inflation, prices, already high owing to the scarcity of foodstuffs and the demand for goods used in the war, were skyrocketed to unusual levels. Throughout the period there were frequent bankruptcies of the small partnership banks throughout the country which could not redeem their notes. In 1797 the Bank of England was permitted to suspend specie payment; that is, it was no longer under the obligation to redeem its banknotes in gold. Irredeemable paper banknotes became virtually the only currency in circulation and prices, expressed in terms of paper, rose even more. Manufacturers, landowners, and farmers were in a position, sooner or later, to raise their rents and incomes to keep pace with prices. The agricultural workers and the town artisans and factory workers were not in such a favorable situation. The whole period was one marked by food scarcity, high prices and inflated currency, and wages which rose less rapidly than prices.

Though there was in consequence of these factors alone a great deal of distress, it must not be imagined that there was any permanent recession in agriculture or industry. Much land, hitherto submarginal, could be cultivated profitably in view of the enhanced prices of grain and the low wages of the field workers. The rents of good land rose. The farming and landowning

classes, in consequence of famine conditions and the lag in wage increases, were prosperous and adopted standards of living beyond anything they had ever enjoyed. Their only real worries were lest the war should end and a cycle of good harvests begin.

War and Industrial Development

In industry the demand for equipment and material for the war and for the requirements of a disturbed continent gave a tremendous impetus to the growth of large-scale manufacturing. Even contemporaries sensed the significance of what was happening. Something has already been said of the rapid development of industry during the decade of the 1780's. One writer thought of this spirited time as a "tranquil condition," a "medium between activity and stagnation" as compared with the briskness of the war period. Iron production stood at 68,300 tons in 1788; 125,000 tons in 1796; 156,000 tons in 1800; 258,000 tons in 1806; and 300,000 tons in 1810. Raw cotton imported was reported as 17,900,000 pounds weight in 1785, 31,000,000 pounds in 1809, and 56,000,000 pounds in 1815. In 1796 20,000,000 square yards of printed fabrics were produced. In 1808 a new method of making cheap printing cylinders was invented and by 1814 124,000,000 square yards of printed fabrics were being made. Cornwall copper production was 4434 tons in 1785, 8166 tons in 1813, 7936 tons in 1814, and 6607 tons in 1815.

All the statistics which are available tell the same story of rapid and phenomenal growth in the productivity of England's workshops and factories. Closer examination of the figures reveals that the growth did not proceed at a steady rate of acceleration, but went by spurts with intervals of slack business. A French victory which put Austria out of action might stop the employment of thousands of workers. The formation of a new coalition would bring blast furnaces, cotton factories, and copper mines back into furiously expanding activity. When orders stopped factories closed, owners occasionally went bankrupt, particularly if their fixed charges for interest on loans were very high, and the workers went on short rations or starved. But within a short time purchases were resumed and industry went ahead to new highs.

In the iron trade, to give a detailed example, there had been considerable expansion of consumption during the later 1780's,

after a depression following the end of the American Revolution. The American market for nails and hardware picked up rapidly after peace was concluded. The Wilkinsons held large contracts for the supply of iron water pipes for New York and Paris, and their business of making cylinders for the Boulton and Watt steam engines was growing. The Carron Company was pushing the sale of domestic stoves. In 1787 John Wilkinson launched his cast-iron barge on the Severn and two years later William Symington completed a steamship. The Coalbrookdale Company, which had not made cannon during the war because of the Quaker convictions of its proprietors, was much interested in cast-iron bridges, the first of which, across the Severn, they had projected in 1776. Tom Paine, returned from politics to engineering, patented a design for a single-span iron bridge in 1788. In line with his plans various bridges were built by the Walkers, one with an arch of 90 feet over the River Don. Another, with a span of 110 feet, was exhibited to the public in London, and a third was erected in 1796 over the River Wear at Sunderland. A similar structure cast at Coalbrookdale was built by Telford at Buildwas.

The outbreak of the war with France in 1793 caused a temporary scarcity of cash among the ironmasters, and in 1795 shortage of grain led certain of them to sell wheat and maize to their workpeople at 25 per cent below cost. At this time Pitt's proposal to tax coal and pig iron was resisted and defeated. In 1797 the suspension of specie payments by the Bank of England caused a little embarrassment. Boulton thought that any premium should be paid for coin to pay wages "rather than any town should be ruined or in flames." But Birmingham employees and other workers agreed to accept paper, and business went on.

Down to 1796 the price of iron remained steady. There was a regular but no dramatic increase in the production of British plants. Imports of iron from Sweden and Russia showed a steady rise. In 1796 the price of foreign iron rose 30 per cent, and domestic production boomed. It was scarcely possible to get sufficient labor to handle orders. Increases in customs duties on foreign iron in 1796, 1797, and 1798 led to still larger orders for domestic iron. Between 1796 and 1798 twenty-one furnaces were put in blast and nineteen more were building. This rapid growth continued through 1800. Orders for cannon were the first factor

in this phenomenal growth. Tariff changes both in England and abroad were also important. Because of political disagreements with Great Britain, Czar Paul of Russia raised the export duties on Russian iron and laid an embargo on British ships in his ports. Trade between Russia and Great Britain was virtually suspended during the latter part of 1800 and early 1801. The possibility of the cutting off of Russian supplies led to further exertions on the part of the British ironmasters. They were aided by a protective tariff duty which in the end of 1798 amounted to £3 15s. 5d. per ton.

The Peace of Amiens did bring a recession in the secondary iron industries, but the war was resumed before the smelting branches were affected. When hostilities were renewed in 1803, the iron trade prospered greatly and this prosperity continued to 1810. The imports of Russian and Swedish iron fell very sharply, especially after the beginning of the Continental System in 1806 and Russia's adhesion to France in 1807.

The friction with the United States, which brought about the American Embargo of December, 1807 to March, 1809, and culminated in the War of 1812, led to a heavy fall in iron exports to the United States. It was estimated that the United States took two-fifths of all Birmingham manufactures; and though there was at first some evasion of the embargo by smuggling through Canada, the iron trade suffered terribly. During 1811 there was acute distress in the iron manufacturing towns, and even the blast furnaces were glutted with iron which could not be sold except at a loss. "Great numbers of labourers have been dismissed within the past twelve months; . . . labourers that twelve months ago could obtain in the ironworks 20s. a week cannot now obtain 10s. or 12s.; and hundreds of them are to be had at 12s.," wrote one ironmaster. In 1812 there was an upturn. New orders for water pipes for London, peace with America, new projects against Napoleon, the fall of imports of Swedish iron because of Sweden's being forced into war with Great Britain, and the levy of an additional £1 per ton duty on imported iron worked together to continue the prosperity of the iron industry down to the end of the war with France in 1815.

Curiously enough, the same feverish development as was found in England took place in France also. Even before the advent of Napoleon the French politicians had sought to exclude Eng-

lish wares, recently admitted by the Eden Treaty, from French markets. Napoleon went the Jacobins quite a step better. He evolved and endeavored to apply a plan to make the continent a closed market for French manufactured goods by discouraging local manufactures in continental areas outside of France and by excluding British goods altogether. By 1811 Napoleon's Continental System was extended to every part of Europe excepting Turkey and Sweden; and business distress in England, coupled with a bad harvest during the winter of 1810-1811 and the loss of the American markets, came close to forcing the British to yield to Napoleon. The policy of blockade cut two ways, however, for the British closed their ports to goods from European areas under Napoleon's control, and in some lines the prohibition of foreign importations led to the more rapid expansion of British industries.

From the beginning the Continental System encountered difficulties. France could not produce all that the continent required, especially in view of the fact that the British navy prevented France from getting certain raw materials in sufficient quantity. The French cotton supply was not completely cut off, but the quantity available was too limited to permit the French manufacturers to supply the vast markets which Napoleon claimed for them. French industry could not even meet all the needs of the French army, and Napoleon was actually forced to buy English overcoats and shoes for his soldiers in the Eylau campaign. Napoleon recognized the deficiencies of French production and permitted the importation of British goods by license; and when he tried to tighten the barriers, his administrative control was too imperfect to keep out the British products which the Germans, Dutch, Poles, and Russians wanted to buy. English merchants, moreover, cushioned the loss of such outlets as Napoleon took from them by the vigorous exploitation of the Latin-American markets, which were opened to British trade after Napoleon's aggressions in Spain and Portugal by the British control of the seas.

The War and the Agricultural Workers

What were the reactions upon the domestic life of the nation of the succession of trade crises by which the war was accompa-

nied? A shift of decided economic importance from the land-owning to the factory-owning classes got well under way. Of greater immediate significance was what happened to the mass of the people.

In the country districts the agricultural laborers were getting 9s. a week when the war with France started. As wheat rose in price to as much as 108s. per quarter (over \$3.00 per bushel) it was scarcely possible for them to feed themselves and their families on their meager earnings. Country gentlemen and farmers early recognized the situation; and the older tradition that the upper classes must look after the poor led them to take some action. While some were moved by fear of disturbances among the laborers, others were certainly actuated by feeling of mercy and pity. In 1795 the Berkshire justices of the peace, meeting in the Pelican Inn at Speenhamland, resolved "That the present state of the poor does require further assistance than has generally been given them." They came to the conclusion that the best way by which that assistance could be rendered was through the increase of wages; and they "very earnestly" recommended to the farmers and others "to increase the pay of the labourers in proportion to the present price of provisions." At the same time they doubted the expediency of their regulating wages of laborers in accordance with the statutes of the reigns of Elizabeth and James I. Such action on their part, which would have fixed maximum, rather than minimum, figures, would have been of no avail.

Not knowing what else to do in the emergency the justices resolved to "make the following calculations and allowances for the relief of all poor and industrious men and their families, who . . . shall endeavor for their own support and maintenance." When the gallon loaf of seconds flour weighing eight pounds eleven ounces should cost one shilling, each man should have for his own support three shillings weekly, "either procured by his own or his family's labour, or an allowance from the poor-rates." His wife and every other member of his family should have one shilling and six pence. "And so in proportion, as the price of bread rises or falls, (that is to say) 3d. to the man and 1d. to every other of his family, on every 1d. which the loaf rises above 1s." In other words the justices first adopted a standard of living, permitting three loaves of bread of 8 lbs. 11 oz. each to

the laborer per week, and from one to one and a half loaves to each member of his family, and then ruled that that standard was to be provided out of the poor rates if the wages of a man and his family were insufficient to do so.

The Speenhamland system, which was authorized by statute in 1796 wherever a district wished to adopt it, was later condemned as a very dishonest business, since it permitted employers of labor to shift part of their wages bill on to the general body of taxpayers. It did work out that way; and by freeing the employers of agricultural laborers of the goad of the fear of disturbances among the workers it prevented a rise in wages. It was even charged that the Speenhamland system degraded the workers in agriculture and robbed them of their self-respect. This is doubtful considering that they had little of that left even before Speenhamland began. Yet with all the real objections to the Speenhamland system because of its evil aftermath, the justices who adopted the system are scarcely to be censured. The understanding of economic phenomena was scarcely great enough in 1795 to enable even the wisest statesmen, let alone a group of local magistrates, to plot a course to meet an emergency in the most perfect fashion. Indeed it is doubtful whether even today such knowledge exists. The Speenhamland justices did the best they knew how in view of their circumscribed legal powers and limited skill in economic science.

The Industrial Workers

Among the industrial workers discontent in the face of rising prices and fluctuating employment took a number of forms. In certain sections there was a tradition of the regulation of industry by the state and a belief even that ancient statutes could be invoked to deal with present evils. The Statute 5 Elizabeth, chapter 4 and other acts provided for apprenticeship in certain industries and for the fixing of maximum wages by the justices of the peace. As late as 1771 the Spitalfields silk weavers had received from Parliament an authoritative price list and a limitation of apprentices in proportion to journeymen in the ratio of 37 apprentices to 216 journeymen. On the other hand, the limitation on the number of apprentices in the felt hat trade had been removed six years later.

During the war the woolen cloth trade suffered from the cutting off of supplies of raw wool from Germany and Spain. At times actual contraction of output took place, and there was no work for many of the weavers. This situation led those weavers who had served their apprenticeship to seek the protection of the Elizabethan statute against those who had entered the craft in days when labor was scarce without proper apprenticeship. Funds were collected to prosecute masters for the employment of non-legal (non-apprenticed) weavers. In 1803 Parliament suspended the apprenticeship clauses of the Elizabethan statute pending the investigation of the subject. A report was made to Parliament in 1806 by a Select Committee, as a result of which the apprenticeship clauses were set aside temporarily and finally, in 1814, repealed absolutely.

In 1804 a petition was presented to Parliament by the journeymen calico printers in Lancashire and other counties asking for a law organizing apprenticeship in their industry, with a limitation on the number of apprentices in proportion to the number of journeymen. Calico printing was an industry not yet in existence in the reign of Elizabeth and consequently not under the provisions of the act of apprentices. The journeymen asserted that the ratio of apprentices to journeymen in their trade was already as one is to one; that apprentices earned from 4s. to 7s. per week against a journeyman's wages of 30s., and that goods were sold on the basis of the higher wage. Parliament rejected the petition.

During the war the cotton cloth weavers at first bettered their position considerably and wages rose. But new workers were drawn from the country districts and, in consequence of their willingness to work for less money, by 1808 wages fell to one-half of what they had been in 1800. The cotton trade obtained an arbitration act in 1800, but arbitration was not effective in preventing further reductions, especially on the part of the smaller employers. The men began to ask the establishment by statute of a minimum wage. The larger employers were not adverse to some such measure, but opinion in Parliament was unfavorable, and the report of a Select Committee, hostile. In 1812 the cotton weavers discovered the wage-regulating clauses of the fifth of Elizabeth, chapter 4, without recognizing that the wages authorized in that statute were maximum rates. Nevertheless they ap-

pealed to the justices meeting in quarter sessions for action under the statute. The only result was that the law came once more to the attention of Parliament and in 1813 the wage-fixing clauses of the statute were repealed. After costly legal action the cotton weavers of Scotland actually secured the recognition in the Court of Sessions of certain rates as legal, but the magistrates refused to enforce these rates. As a consequence a great strike took place in 1813, in which 40,000 weavers took part. The leaders were held guilty of crime in organizing the strike, arrested, and jailed.

The statute 5 Elizabeth, chapter 4 had been passed to regulate industry in the beginning of the reign of Elizabeth; its specific provisions were altogether unsuited to conditions early in the nineteenth century. It was, moreover, motivated a good deal more in the interests of the agricultural classes and of the rising industrialists of its own day than in the interests of the workers. Its repeal was no great loss to the workers in so far as any definite help arising from it was concerned. On the other hand, its repeal marked the abandonment of the policy of state regulation of industry in favor of a policy of natural liberty and freedom from control. It was now asserted in Parliament that "the persons most competent to form regulations with respect to trade were the master manufacturers, whose interest it is to have goods of the best fabric, and no legislative enactment could ever effect so much in producing that result as the merely leaving things to their own courses and operation." The law was condemned because of its tendency to abridge the liberty of the subject and to prevent competition among workmen. "The principles of true political economy never changed and those who did not understand the science had better say nothing about it. Trade, industry and barter would always find their own level and be impeded by regulations which violated their natural operation and deranged their proper effect." In a word, the ideal of the well-ordered state was abandoned and the workers were left naked and open to competition with each other and to every fluctuation of trade in a time of highly speculative industrial development. In a period of boom times there was an enormously rapid increase of workers performing some easily learned process. In slack periods these workers competed with each other—the unskilled with the more skilled, the women with the men, and children with both. Perhaps too much importance should not be attached

to the abandonment even of the ideal of the well-ordered state. Basically this involved merely the assurance to every man of a living in the station to which God had called him. In the dynamic society of the early nineteenth century some wider concept than that was necessary to solve the social problem.

Curiously enough, even while the notion of any state regulation was being abandoned, the beginnings of the more modern system of state control of industry were introduced all unconsciously and by a sort of back door. The parish apprentices were actually under the poor law. The unsanitary conditions which prevailed among them and the epidemics to which these gave rise finally led to intervention by the state in their behalf as an extension of its duty under the poor law. Years after Dr. Percival of Manchester published his findings anent their health conditions, Parliament enacted the Health and Morals of Apprentices Act of 1802, regulating their conditions of work and living. True, there were few parish apprentices any longer employed in industry, and there was no effective provision for enforcing the act anyway. Nevertheless, the Health and Morals of Apprentices Act was the precedent for future factory legislation, whose aim was the restriction of competition between workers and the compulsory maintenance of certain standards of life.

Trade Unionism During the War

In the newer industrial towns of the north and west the tradition of state regulation was lacking. As hunger began to pinch their stomachs these workers turned first on the farmers and dealers who were supposed to be responsible for high prices and starvation. Even before the French Revolution had begun the workers in Glasgow cotton mills had refused to have their wages reduced. The riots which followed showed a certain amount of organization among the workers. In 1792 a similar conflict at Bolton and Bury (near Manchester) resulted in a collective contract between the employers and organized workers.

This type of self-help in the form of benefit clubs or "communities" among the workers became popular. These organizations were the first of the modern trade unions. Their members paid contributions to a common fund to pay for appeals to Parliament and to take legal action to compel their masters to obey

the law. The early trade unions were not regarded with any favor by the dominant classes. In the past "combinations" of workmen had been repeatedly suppressed on the ground that they were in restraint of trade and that they infringed the authority of the state which alone had the right to regulate industry. Moreover, at this time combinations of any character among workmen might be cells for the spread of French ideas and centers for popular rising.

In 1799, in response to a petition of the master millwrights of London, whose journeymen had just conducted a strike, Parliament took up the matter of combinations. The Cabinet brought in a bill to outlaw all associations either of workers or of employers. The act was passed in 1799 and was amended by a second act of 1800. These laws, known as the Combination Acts, provided that any combination of workmen or of employers was illegal. Any workman who combined with any other workmen to secure increase of pay or reduction of hours was liable, on conviction, to be sent to prison for three months. The same penalties awaited anyone who should persuade or endeavor to prevail upon another to leave his work, or who should refuse to work with any other person, or who should attend any meeting for shortening hours or raising wages, or who should persuade anyone else to attend such a meeting, or who contributed to such a meeting. The funds of workers' societies were forfeit, one-half to the Crown and one-half to anyone who sued for them. The Act of 1800 provided for arbitration in case of trade disputes, but though the idea was popular, the arrangements set up were not very successful.

On the whole, the war period had seen the acceleration of a series of developments already under way. The expansion of industry had been greatly speeded up by the war itself. The remnants of Tudor regulation were discarded. With this disappearance the English state adopted the policy of non-intervention in industry. This does not mean that mercantilism was abandoned. Considerable parts of the old mercantilist system, comprising farm relief measures, the navigation acts, the colonial system, and tariff protection, remained intact and were actually to be extended. Some of the working classes had hoped to see parliamentary and franchise reform as a step toward a new system of state regulation to mend evils growing out of low wages, high

prices, and unemployment. Others put their confidence in trade unions. For the moment both trade unionism and agitation for parliamentary reform were suppressed by the legislation of 1799-1800.

The Principles of Political Economy

In the discussions of the period from 1790 to 1815 there was a good deal of appeal to the principles of political economy, accompanied by self-congratulation that happily the precepts, of economic science were better understood now than in former times. What were these principles of political economy?

In the year 1776, within a few months of the completion of the first Watt steam engine and of the signing of the Declaration of American Independence, Adam Smith published a book under the title of an *Inquiry into the Nature and Causes of the Wealth of Nations*.

Like so many thinkers of the eighteenth century, Adam Smith was annoyed by existing restraints and restrictions upon the individual which no longer seemed to have any significance. Following the current fashion, he was inclined to stress "nature," or what was instinctive or "natural" to men before they had submitted to regulations. He contrasted with the conventionalized traditional ways of doing things "the obvious and simple system of natural liberty." In the field of agriculture the old systems were not only exasperating but they did positive harm. This was evident when the backwardness of the unenclosed districts with their antiquated customs carried out under communal control was compared with the progressiveness of the enclosed villages where each individual followed an instinctive or natural effort to improve his condition. Adam Smith rationalized his observations into a system of economic teachings. He traced the development of institutions from the workings of self-interest. The natural institutions such as the division of labor, money, and capital which were thus evolved seemed so fundamentally good to Smith that he suggested that they were more than good; they seemed to be providential. There was an accord between private interest and the public good. As each man did the best he could for himself, he seemed to be working in the best interests of society as a whole. Smith was not categorical on this point. He recognized

that the distribution of wealth was not the most just that could be conceived. He asserted that capitalists loved to reap where they had not sown, that rents and profits ate up wages, and that the upper classes oppressed the poor.

His general conclusions from the naturalness of institutions and his optimistic view of their operation was that all government interference in economic life was bad. This was especially true of the ownership and management of land by the state. Here the most minute attention to detail was necessary, and the state could give only a general oversight. He saw that private enterprise had its defects also, especially if it had a monopoly or was not directed by those who had a personal interest in the undertaking. He was especially opposed to joint stock companies.

In foreign trade he believed that free exchange should rule. He felt that all advance in civilization had come through the division of labor; and that in this regard the international division of labor was as important as the division of labor within a country. Foreign trade benefited both parties, he insisted, and he demolished pretty effectively the mercantilist view that a "favorable trade balance" and the importation of money were of any particular value. Yet he admitted certain exceptions to his general view that international trade should be free of all restrictions. On the ground that self-defense was better than opulence, he defended the Navigation Acts, because, as he supposed, they had given Britain control of the seas. He admitted differentials in customs duties to compensate for internal excises, and he felt that retaliatory duties were permissible. Furthermore, existing customs duties were to be repealed slowly, in order to give interests which had grown up under them a chance to make adjustments.

Smith wrote before large-scale machine industry was well developed. He was really much concerned with agriculture and with the abolition of communal control in favor of individual management. He was suspicious of "merchants and manufacturers," believed in high wages, and favored the workers against their employers. In one place he wrote that "whenever the legislature regulated the differences between masters and the workers, his advisers are always masters. Consequently when regulation is in favor of the workers it is always just and equitable. But it is quite otherwise when it is in favor of the masters."

Adam Smith became very popular with the ruling classes during the period of the wars with France. William Pitt once spoke of the members of the House of Commons as all being Smith's pupils. But if they were Smith's pupils, they learned from him only what pleased them. They carefully overlooked all of Smith's careful exceptions to his general rules. They argued that he taught that full play must be given to individual initiative, that perfect freedom on the part of the employers was the best stimulus to production, and that all temporary advantages resulting from unrestrained competition would adjust themselves. The system of natural liberty was not taken to mean that high protective tariffs against Swedish and Russian iron or other commodities must be reduced or that the various bounties and special privileges prevailing in agriculture, shipping, and commerce must be repealed.

The state, it was believed as a result of Smith's teaching, could do nothing for the workers. It was pleasant at the same time to find that their employers could not injure them. This was the net result of the economic teachings of Thomas Robert Malthus, who published in 1798 his *Essay on the Principle of Population as it affects the future Improvement of Society*. Malthus had had a dispute with his father on the subject of the perfectability of the human race. To put his father (and all similar optimists) forever in the wrong, Malthus asserted that population, if left to itself, would double every twenty-five years, that is, by geometrical progression, in the series 2, 4, 8, 16, 32, and 64, while subsistence increased only by arithmetical progression, in the series 2, 4, 6, 8, 10, 12. Malthus seemed at once to explain poverty and to transform vice and misery, which kept population in check, into agents of Providence. It is of course not necessary to point out that Malthus introduced many important qualifications to his "principle," such as the assertion that population as a matter of fact might be checked not only by positive or repressive obstacles, such as wars and famines, but by preventive obstacles, of which the chief was moral restraint, or "abstinence from marriage joined to chastity."

The notion that poverty was not an unmixed evil but even a blessing in disguise was a rather common escape from conscience in these years. Thus Patrick Colquhoun writing between 1812 and 1814 sang the praises of poverty as a component element in

British greatness. "Every state is supported by the poverty of the community composing the body politic. Without a large proportion of poverty there could be no riches, since riches are the offspring of labor, while labor can result only from a state of poverty. . . . Poverty is therefore a most necessary ingredient in society without which nations and communities could not exist in a state of civilization. It is the lot of man. It is the source of wealth, since without poverty there could be no labor, no riches, no refinement, and no comfort, and no benefit to those who may be possessed of wealth, inasmuch as without a large proportion of poverty surplus labor could never be rendered productive in procuring either the conveniences or luxuries of life."

Yet even if one agreed that poverty was a necessary good, one might still question whether the distribution of wealth among the wage earners might not be a little more generously arranged, since Smith and other economists started with the axiom that labor was the source of wealth. This question was answered in various ways by radical economic writers such as Owen, Gray, and Bray, who attacked not only the proportion of the distribution of wealth, but the mode and the method. Just after the war the problem was taken in hand by David Ricardo who explained that the rewards of labor were governed by the law of supply and demand. The wages of labor were decided by the sheer force of competition and tended to gravitate toward the minimum of subsistence. "The market price of labour is the price which is really fixed for it from the natural operation of the proportion of the supply to the demand: labour is dear when it is scarce, and cheap when it is plentiful. However much the market price of labour may deviate from its natural price it has, like commodities, a tendency to conform to it." Ricardo again was not categorical or rigid about these assumptions, but those who read him and those who wrote in imitation of him were.

Ricardo also attacked the prevailing notion that high rents for land spelled prosperity by showing that rent was the result of the barrenness rather than of the bounty of nature. Rent represented the differential between good land and the marginal land on which the cost of raising crops just equaled the selling price. The higher the cost of food, the lower the margin. Thus, high food prices created high rents. Consequently, he condemned the Corn Laws which kept the price of grain above its natural level.

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Chapter 21

ENGLAND AFTER THE NAPOLEONIC WARS

By 1815 Great Britain definitely led France in the industrial race. French businessmen had shown great resource and French science backed them up by such inventions as the process of making beet sugar. But France had not as yet begun to exploit her coal or to harness the power of steam, and because of the superiority of the British navy she could not rely upon overseas areas for either raw materials or markets. England had won the war, she had gained a new empire in the annexation of French and Dutch colonies, and she was regarded as the workshop of the world.

This is a good year from which to survey certain general factors affecting the development of British economic life during the next thirty-five years. These factors are the growth of population, the recurrence of depressions, tariff changes, labor legislation, and price movements.

The population of Great Britain continued to grow apace. In round numbers the figures were 10,000,000 in 1801, 12,000,000 in 1811, 14,000,000 in 1821, 16,000,000 in 1831, 18,000,000 in 1841, and 20,960,000 in 1851. In 1851, for the first time in any country in modern history, half the population lived in cities and towns. At this date agricultural workers, including farmers, graziers, laborers, and servants, still formed the largest single group of the population. Those in domestic service numbered over 1,000,000; cotton and other textile workers, 1,176,000; iron workers, including iron miners, 107,500; building craftsmen, 443,000; milliners, dressmakers, and seamstresses, 340,000; coal miners, 219,000; tailors, 153,000; washerwomen, 145,000; merchant seamen, 144,000; blacksmiths, 112,000; carters, carmen, coachmen, and busmen, 84,000; railway workers, 65,000; machine- and boiler-makers,

63,000; bakers, 63,000; copper, tin, and lead miners, 60,000; char-women, 55,000; commercial clerks, 44,019—the 19 being women; fishermen, 38,000; millers, 37,000; pottery workers, 36,000; ship-builders, 32,000; straw-plait workers, 32,000; wheelwrights, 30,000; nail-makers, 29,000; tanners, 25,000; and printers, 22,000; in addition to 376,000 unspecified laborers.

Business Depressions

In spite of England's advanced industrial position at the end of the Napoleonic Wars, she was distressed, after peace was made in 1815, by periods of depression more widespread and devastating than any hitherto known. The iron industry had grown to enormous proportions on the basis of war orders plus orders for civilian purposes, such as steam engines, water pipes, bridge castings, and nails and hardware. Production capacity was far in excess of "normal" peacetime needs. Although the ironmasters through their "meetings" attempted to maintain prices, sales were made at greatly reduced figures. Since rents and royalties paid by the ironmasters were generally at rates corresponding to the high prices of the war period and could not be reduced immediately, many ironmasters had no recourse but to shut down. Many plants were sold for sums which represented only a sixth or a seventh of their original cost; others were broken up and disposed of as scrap. In August, 1816, there were twenty-four iron furnaces in Shropshire, each normally employing three hundred men, which were out of blast, and only ten were in blast. One firm had 5000 tons of iron on hand; another 3000 tons. The "extinguished works" normally consumed 8000 tons of coal a week, and so a corresponding number of colliers also were destitute. A few months later the Reynolds dismantled their works at Ketley and sold the machinery, with grave consequences for the countryside. In Staffordshire one observer spoke of the "silence of unmingled desolation" of the great ironworks of John Wilkinson at Bradley. In one town, Bilston, 2000 men were unemployed. In the ring of towns around Wolverhampton 12,000 men were out of work. In Wales the starving workers rioted and the militia were called out to teach them to die quietly; elsewhere "poverty and dejection were too intense for the spirit of revolt to assert itself."

Slowly the operation of the self-adjusting price mechanism working in conjunction with new civilian construction began to bring about better conditions. The demand for water pipes continued and gave employment in Staffordshire and South Yorkshire. The introduction of gas-lighting in cities required miles of new mains and thousands of lampposts. The Walkers of Rotherham were kept going through their contract to furnish 5000 tons of castings for Rennie's new Southwark bridge over the Thames. Part of this contract was let out to two other firms, so that they too were helped through the worst period. It was not until 1823 that real improvement became apparent, and by 1825 a boom was definitely under way.

Elsewhere in British industry depression conditions also prevailed. The labor market was flooded by the discharge of 300,000 soldiers and sailors and their return to civilian life. Wages fell, but the cost of living, while down somewhat from the peak of 1812-1813, remained far above the levels prevailing before 1790. Europe, impoverished by the war, was too poor to resume buying British goods; and, moreover, every European country began to show signs of wanting to do its own manufacturing. The United States market was definitely restricted by the conscious purpose of the Americans to become independent of Europe; and after the end of the War of 1812 they adopted a protective tariff policy with a view to favoring their own industries.

The Corn Law of 1815

One group in Great Britain, the agricultural interest, was in a position to try to protect itself against the dangers of peacetime recessions. The farming elements of the nation believed that their control of the seats in the Lords and Commons entitled them to enact such legislation as would prevent the fall in the price of grain which the return of good harvests and of peace would entail. In a sense they merely continued the tradition of agricultural protection and farm relief to which they had been accustomed for more than a century. In 1815, in order to keep up grain prices and land rents which were based on them, the Parliament enacted a Corn Law which had as its object the maintenance of the price of wheat at 80s. per quarter, or about \$2.50 a bushel, and of other grains in proportion. This was to be

accomplished by prohibitive duties on the importation of grain when the price was below the desired figures.

The purpose of the Corn Law of 1815 was not attained. Owing to a series of bountiful years home production of grain was so great that prices fell even though foreign importation was restricted. On the other hand, the measure was regarded by other groups as a particularly offensive abuse of power. The manufacturers felt that the Corn Law held up wages by keeping up the cost of food and thus prevented British goods from competing with the goods produced by the lower-paid workers of the continent. Others held that the only way in which continental peoples could pay for British goods was through the sale of grain; and, by excluding grain from the British ports, the Corn Law effectively cut off British exports, since the Corn Law prohibited the use of the only kind of payments which the Europeans could make. If a nation did not buy, neither could it sell. Among the workers the hostility to the new law was more simply put. The Corn Law increased the cost of food at a time of widespread unemployment and hunger.

It would have been strange indeed if the manufacturing classes and the workers had not seen almost at once the obvious lesson of the Corn Law. Political power could be used to afford economic protection. Therefore it was requisite that classes needing the intervention of the state in their own economic interest or desiring to prevent another selfish group from exercising such intervention on their own behalf must get political power. The desire to break the monopoly of the agrarians in Parliament finally resulted in 1832 in the enactment of a statute altering the system of representation in the House of Commons and the qualifications for the franchise in favor of the propertied elements among the industrial and commercial classes.

The depression which followed the war reached its nadir in 1818-1819. In 1821 and 1822 prices began to fall; and with their gradual return to the price levels of 1790 the consumption of British goods in Great Britain and on the continent mounted rapidly. By 1824 improvement in business was so marked that it was possible for the government to take in hand certain reforms which in themselves further encouraged business. During the early 1820's the disorderly array of tariff schedules, such as the 1200 different classifications of articles which made up the

English tariff in 1815, already had been simplified. Conscious efforts were being made to give the home producer enough protection to keep him safe from foreign competition, while at the same time certain raw materials necessary in industry were admitted at lower rates of duty. In other instances changes were made in the British arrangements to meet or to secure the abandonment of retaliatory measures recently adopted by other countries.

In 1824 there was actually a surplus over expenditures to devote to "experiments." Reductions of duties thus were made possible. After assigning certain sums to the repair of Windsor Castle, the foundation of the National Gallery, and the building of new churches in London, the government decided to reduce the duties on rum, coal, raw wool, and silk. Prohibitory duties were replaced by levies of 30 per cent. In 1825 still greater surpluses permitted further reductions, so that some schedules of duties were lowered to 10 per cent.

In the rearrangement of the more general tariff schedules English statesmen not only had to deal with the problem of setting a good example to other nations which were raising their duties against British goods and were adopting retaliatory measures against the Navigation Acts, but they had to answer the demands on the part of business interests for lower duties on timber and wool and raw materials generally. As the British policy was worked out the Navigation Acts were gradually relaxed, beginning with concessions to the United States. Between 1821 and 1825 duties on raw materials were very much reduced. In the case of manufactured goods the effort was made to discover the exact figure at which the rates would seem low enough to the foreigner to keep him from adopting similar duties, and yet high enough to keep out foreign goods. In the tariff of 1825 rates ranging between 10 and 30 per cent were adopted—high enough in every case, considering the British superiority over foreign industry, to prevent foreign competition; low enough to forestall retaliation. For the greater part of the first half of the nineteenth century, therefore, England continued to enjoy the blessings of mercantilism. It was not until the decade of the forties that serious departures from the system of protection were made.

In all projects for tariff changes nothing was further from the thought of the cabinet than the abrogation of the Corn Laws.

In fact, in 1828 what was hoped would prove to be a more effective form of corn law was adopted. It replaced the fixed duties by a sliding scale of duties, which rose and fell as the prices of corn varied.

The Repeal of the Combination Acts

Through the efforts of a small group in and out of Parliament another notable reform was carried through during these years of the 1820's. The most fashionable tailor in London, Francis Place, had read in 1810 of a savage penalty inflicted upon compositors of *The Times* under the Combination Acts. Himself originally a journeyman breeches-maker, he had never lost touch with the workers and now resolved to destroy these iniquitous laws. He did not like combinations, but with a logic strictly in accord with his laissez-faire views, he argued that any legislative interference with capital or labor was wrong. He rather hoped that once the Combination Acts were repealed, the workingmen would see how useless unions were and give them up.

After long preparation, Place and Joseph Hume, his ally in the House of Commons, prepared a motion asking for a committee of the House to consider the repeal of laws relating to the emigration of artisans, the exportation of machinery, and combinations among workmen. The committee was appointed; witnesses carefully marshaled by Place gave their evidence; a bill for repeal was drawn up, and passed without debate.

The very prosperity which made the bill possible almost proved its undoing. Once unions were given legal toleration, they arose everywhere and conducted great strikes to turn some of the current good times into higher wages. The shipowners appealed for a repeal of the new law of 1824. Huskisson prepared a measure which would have destroyed trade unions altogether. Hume and Place were able to substitute for this bill another which gave the unions a bare right to exist. While collective bargaining was permitted under the new act of 1825, which replaced that of 1824, all measures necessary to making it effective were prohibited. Nevertheless there was a good deal of growth of trade unionism in the next decade.

The prosperity of 1824 and 1825 was only temporary. Hard times prevailed during the later 1820's. The period from 1830

to 1837 was a prosperous era. The late 1830's and early 1840's (1837-1843) witnessed such letdowns in many lines of business, accompanied by unemployment, that the term "the Hungry Forties" has been applied to these years. Improvement ensued during 1844 and 1845, but during the next few years crop failures, particularly the ruin of the potato crop, brought acute distress in Ireland, Great Britain, and on the continent. The year 1848 was one of the hardest years of the century; and the revolutionary outbreaks which occurred everywhere were in all probability more related to hunger than to theoretical interest in new constitutions. By 1850 the beginning of a long term of "prosperity" was under way.

In a general way depressions did not mean that every factory and workshop was closed. Many enterprises continued to make money and many workers continued to be occupied. In fact, in so far as the rather meager statistics of the time can be trusted, the low point of production and business activity in a period of depression was higher than the high point of the period of prosperity antecedent to the latest boom. That is to say, the business of the years from 1837 to 1842, a time of intense depression, was still greater in volume than that of 1821-1824, the period of prosperity which last preceded the boom between 1832 and 1836. But because workers, mills, ships, railroads, and capital were keyed to the scale of 1836 rather than of 1824 the business available left many unemployed workers, many idle plants, much capital without earnings.

Prices and the Cost of Living

During the Napoleonic wars prices rose rapidly, partly as a result of the excessive demand of the wars for materials to be destroyed in battle, partly as a result of the inflation by various governments of their currencies, and partly because of a series of bad harvests. The curve of the cost of living surged upward to peak points in 1800-1801, 1812-1813, and 1817-1818, with slight recessions between. The peak of 1817-1818 was not quite so high as that of 1800-1801 or of 1812-1813. From a base level of 100 in 1790 living costs stood at 174 in 1801, 187 in 1813, and 159 in 1818. The lowest point reached between 1801 and 1812 was 138; between 1813 and 1817, 135. The years 1800-1801, 1812-1813,

and 1817-1818 were years of terrible suffering on the part of the masses of European peoples; for such wage increases as there were, perhaps 20 per cent, did not compensate for a rise in the cost of living of as much as 87 per cent. In 1821-1822 there began a real decline in prices and living costs. The index number for 1822 was 110, only 10 per cent above that of 1790. Although there were fluctuations from year to year, the general trend of prices in the period from 1821 to 1852 was downward. The cost of living in 1850 was only 83 per cent as high as it had been in 1790. The average price of commodities fell in 1852 to less than one-half what they had been in 1812-1813, the peak year of the war. At the same time some of the wage gains made during the war were retained. The purchasing power of the masses of the people was thus greatly raised above the level of 1790. "Real" wages rose by as much as 50 per cent. The result was a momentous increase in demand, on the part of large numbers of people, for additional food, clothing, shelter, and other commodities, which reacted directly upon production. Demand created supply. Some very able economists attribute the general quickening of European and American life which was evident in the early 1820's to this factor.

The fall in prices which began in 1821 and continued to 1852 was a means by which a larger share of the products of the farm and the factory was given to the masses of the people, and as a result of that redistribution economic progress of a marked sort was initiated. Why, it may be asked, did not the leaders of British life provide for the continuation of the same sort of development in the future by constantly raising "real" wages either through progressive increases of actual money wages or progressive reductions of prices? The answer is to be found in the fact that the whole price movement of this period was the unpremeditated result of the operation of a chain of economic developments, the very existence of which was unrecognized by contemporaries. Men not only did not know how to manipulate prices; they did not even realize the significance of their rise and fall. Moreover, such was the mental attitude of men of the early nineteenth century that they certainly would never consciously have initiated any program which in effect deprived them of a portion of their profits, even though the ultimate outcome would have increased absolute profits. As far as the matter of raising wages is con-

cerned, the attitude of industrial and political leaders and economic thinkers of that day is well summed up in the "iron law" of wages. They really believed that when prices went down and a depression came, wages must fall.

The continued rise in money wages and the general fall in prices during this period took place in a time when the population was increasing with great rapidity. The whole development can be explained only in terms of a great quickening of industrial and agricultural productivity. The causes of this are to be found, first, in better seasons for farming, in general technological progress both in industry and agriculture, which increased output and cut production costs, and in a dramatic revolution in means of transportation by land and by sea which reduced the costs of place utilities. These matters will be dealt with in the next chapter.

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TECHNOLOGICAL PROGRESS, 1815-1850

The Development of Agriculture

DURING the eighteenth century English agriculture had seen, in many instances, the abolition of communal control over the villages, the consolidation of holdings, and the use of new crops and farming techniques. Yet even with the introduction of artificial grasses, improvements in breeds of stock, and better systems of crop rotation which, with the more careful use of fertilizers, did away with fallow, much still remained to be done along all these lines during the first half of the nineteenth century. Subservience to tradition and plain ignorance had kept many from following the practices of the best farmers and landlords. At the end of the war grain prices fell, and the downward movement of farm incomes forced many of the more backward farmers out of existence. Their land was taken up by more energetic occupiers. The repeal of the Poor Law in 1834 lightened the burden of local taxes, although it led to an increase in the farm wages bill. The Tithe Commutation Act of 1836 substituted a money payment for the ancient tithe in kind. The change was regarded as a great boon to agriculture.

When the war with Napoleon ended in 1815 many villages were still unenclosed. A general enclosure act in 1845 facilitated the completion of the process with all that implied for improved farming. Much attention was paid to drainage, one of the most serious problems for the English farmer. A real solution was found in the invention of the cylindrical drainage tile in 1843 and of a machine to manufacture it cheaply in 1845. In 1848

Peel introduced government Drainage Loans and drainage works were carried through on a large scale.

Scientific agriculture may be said to begin in this era. Under the auspices of the Board of Agriculture, Davy gave lectures on agricultural chemistry early in the nineteenth century. The great landmarks in this field are the publication in 1840 and 1842 of Johann von Liebig's volumes on agricultural chemistry, tracing the relations between the nutrition of plants and the composition of the soil. Liebig's work was tested and rules for its adoption in England were evolved in the agricultural experiment station at Rothamsted. One writer has said that "if the new agriculture was born in the laboratory of Giessen, it grew into strength at the experimental station of Rothamsted." There Lawes and Gilbert began their experiments, which still continue, on the best methods of fertilization, the rotation of crops, and the results of various types of animal feeding in the production of meat, milk, and manure.

Practical farmers were trained in the Royal Agricultural College, and the Royal Agricultural Society of England, founded in 1838, broadcast over the country through its *Journal* the latest scientific discoveries.

The interest in fertilizers which had been so marked a feature of eighteenth-century farming was both more general and more intensive. "Artificial" fertilizers, to supplement barnyard manure and marl, were carefully studied. The discovery of the guano deposits on the islands west of South America led to a brisk use of guano. Nitrate of soda was introduced in 1835. Bones were extensively used. At first they were broken into small pieces with a hammer; later they were ground. In 1840 the treatment of bones with sulphuric acid was suggested by Liebig. Three years later Lawes began the manufacture of superphosphate of lime at Bow. The manurial value of blood from the slaughter houses mixed with bones and sulphuric acid was discovered; and coprolites and other mineral phosphates treated in various ways began to be used.

The *Journal* of the Royal Agricultural Society provides ample evidence of both the improvement of farm machinery and of its increased use. Plows, harrows, drills, horse-hoes, scarifiers, cultivators, and clod-crushers were more and more adapted to special soils and special uses. Various types of reaping machines were

brought out; mowing-machines, haymakers, and horse-rakes lessened work on the farm; and threshing and winnowing machines, already known in the eighteenth century, were improved. On some of the most advanced farms steam power was introduced to drive the machinery; but since the transmission devices, consisting of long cables from stationary engines to the machines in the field, were inefficient and costly, the use of steam in harvesting was merely experimental. In the barn, if the farm were large enough, a steam engine might be very useful in operating turnip and chaff cutters, threshing and winnowing machines, and elevators.

So remarkable was the increase in the output of British agriculture that although an increasingly large amount of grain had to be imported each year, Great Britain fed on her own wheat 5,000,000 more persons in 1849 than in 1811.

Coal and Iron

At the side of the farmer in exploiting the resources of the earth stands the miner. Of special importance in the early nineteenth century was the raising of coal and iron ore. Bismarck's famous recipe of blood and iron as the foundation of the German Empire would be more accurately rendered as potatoes, coal, and iron; and this formula would apply in England also.

The story of coal is readily told. In 1816 Great Britain was raising 16,000,000 tons of coal a year. The South Durham coal field was scarcely touched, and the value of the steam coal of South Wales was unrecognized. By 1850 the British output was 56,000,000 tons annually. While even as late as 1850 there were many open workings, shallow pits, and drift mines cut into hill-sides, most of the coal (outside of Wales) that really drove the country came from the deeper and deepest pits. During the 1830's the Monkwearmouth mine had gone to 1590 feet, although common opinion held that 1200 feet was the limit of efficiency. In the years 1838-1843 the Murton Colliery spent over £250,000 to sink three shafts to reach the Hutton seam at 1483 feet. During the 1840's a Staffordshire pit went down 2100 feet. These were the deepest mines. In Lancashire most coal during the 1830's came from mines only 100 feet deep, but even here deep mines were being put down. At Pendleton the pit ran down 1392 feet

to a 7-foot seam of coal. The company was able to send a thousand tons of coal a day to Manchester. The Wigan field, which supplied Liverpool, did not reach 1200 feet until 1849.

The new pits represented great progress in engineering. In place of the small winding engines with hempen cables and hazel-rod corves or baskets which were used to hoist miners and coal to the surface during the 1820's and 1830's, the 1840's used wire ropes, iron tubs, and cages. At Monkwearmouth in 1849 four tons of coal were raised 1716 feet in 65 seconds.

Ventilation, previously supplied by fire baskets at the most needed points, was now produced by great furnaces placed at the bottom of the upcast shaft. By the 1840's this method was almost universal in certain districts, and wherever it was used it was deadly dangerous, since the upcast shaft thus turned into a chimney was used also as a traffic lane by the miners and for the coal. Only after 1849 was forced draft introduced. Dangerous methods of ventilation were not the only bad feature of the coal-mining industry in the first half of the nineteenth century. Some of the labor conditions found by a parliamentary commission as late as 1842 can scarcely be described for their sheer heartbreak.

The Iron Trade

The progress in the iron trade may be summed up by a short table of pig-iron production. In 1830 pig-iron output was from 650,000 to 750,000 tons; in 1840-1841, 1,500,000 tons; in 1847-1848, 2,000,000 tons; and in 1853, 2,700,000 tons. At this time a competent observer wondered whether this rate of production could be maintained.

The greatest expansion in the generation after 1830 was in the Scottish branches of the iron trade, which increased their output from almost nothing to 540,000 tons a year. By 1847 Scotland was turning out more than one-fourth of British iron. Her production was based on the exploitation of the Blackband iron ore, the Neilson hot blast, and easy access to coal and to tidewater. Yet English output as a whole increased by 150 per cent; that of Staffordshire doubled. The Scottish, South Wales, and Staffordshire blast furnaces turned out four-fifths of British production in 1847. In 1845 the Cleveland ores of southern Yorkshire were dis-

covered, but the heyday of the Cleveland district was just beginning in 1850. During the next thirty years it was to dominate the British iron trade.

In the smelting of pig iron from the ore the most notable improvements consisted in the pre-heating of the air used in the blast, introduced by Neilson in 1829, and in the enlargement of the blast furnaces. Neilson's method made it possible to use the Scottish splint coal without coking it and saved one-third of the fuel used previously. In 1830 the 28 Scottish furnaces turned out 28 tons of pig iron each per week; in 1838 41 furnaces averaged a make of 70 tons each per week, and in 1847 89 Scottish furnaces averaged 120 tons per week each.

The pig iron was used either as cast iron or as puddled iron as in the past. Steel was still produced only on a small scale and continued to be used for such things as precision instruments, bearings, cutlery, and watch springs. The usual method in use for making steel by adding charcoal (carbon) to small quantities of iron molten in crucibles did not offer any great possibility of a rapid expansion in output.

Puddled iron as made by the Cort process (invented in 1783) required the use of two tons of pigs to produce one ton of puddled or malleable bars. During the wars Homfray's Welsh process had cut down the pig used in a ton of bars to 30 or 35 hundredweight. In 1839 Nasmyth introduced his great steam hammer to shingle or beat the iron masses as they came from the puddling furnace before being rolled into bars. There was a further reduction to 26 or 27 hundredweight of pigs to produce a ton of bars.

The increase in production of iron was of course the reflex of increased demand. For years after the wars gas and water pipes provided a seemingly endless market for cast iron. Then in the middle 1820's railroad construction began. Although the first rails were light, only 33 lbs. to the yard, heavier weights were rapidly demanded. By 1841 a single mile of track required 156 tons for rails and chairs. The 2000 miles of railroad built in 1847 must have used 400,000 tons of iron for rails and chairs alone, to say nothing of siding and rolling stock. Foreign nations also became customers on a larger scale. In the 1820's one-tenth of British iron was exported; in 1848 more than one-fourth, particularly to France and the United States. Great Britain was making, in 1850, one-half the pig iron of the world.

Progress in Transportation

Of great significance during the first half of the nineteenth century was the advancing trend toward city life. Country populations still grew, but cities grew faster. In the single decade from 1821 to 1831 Sheffield, Birmingham, Manchester, Leeds, Liverpool, and Bradford all gained more than 40 per cent in population, and London was experiencing that mushroom growth which enriched many a Forsyte and brought such social problems in its train.

In this fact of urban growth there is revealed one of the effective causations of social progress of the time. The cities provided markets for country produce which made it worth while for the farmer to work harder and to introduce improved methods into agriculture. Through their greater efforts the farmers, and the miners too, could satisfy their desire for the manufactured goods which the towns made. A further stimulus in this direction was given by improvements in communication and transport. Place utilities were reduced in cost. Districts recently far apart were brought physically and psychologically closer together. The area from which supplies could be effectively drawn was widened and the distribution of finished goods in exchange similarly extended. The new agencies of transportation themselves used great quantities of materials, such as bricks, timber, coal, and iron, in their construction. This development of transportation and communication involved first of all areas within the same country, but it also strode over national frontiers and even brought distant continents within closer touch. In 1834 Sir Robert Peel hastened from Rome to London to become prime minister. Traveling at record speed he made the journey in twelve days. Thirty years later the same journey could be made in 59 hours. In 1850 New York was only a little farther in point of time from London than Liverpool had been in 1750, and Paris was closer to London than Canterbury had been.

Roads and Canals

The initial factor to be considered in the development of transportation and communication in the early nineteenth century was

the continuation of road and canal building which had been begun in the eighteenth century. The first quarter of the nineteenth century is the great age of the turnpike road and the canal, the stage coach, the diligence and the *coche d'eau*, the posting inn, and the courier. By 1830 England had about 20,000 miles of turnpike roads out of a total of 125,000 miles of roads of all sorts. Thousands of private carriages and hundreds of public coaches, bearing such inviting names as the Sleepy Leeds, the Peak Ranger, and the Red Rover, carried the mails and passengers at speeds which reached a maximum of ten miles an hour on the four-hundred-mile journey from London to Edinburgh.

There were also 4670 miles of canals and improved rivers, and so heavy was the freight traffic over some of these "navigations" that the companies which owned them paid usually high dividends, as has already been noted. Yet while the ten best companies averaged dividends of 27.6 per cent a year, the average return upon the total investment in canal enterprises in about 1825 was only 5.75 per cent.

The reason for this low average dividend upon the investment in canals is to be found in the lack of foresight and system with which they were built. There was little regard to arranging new construction to become part of a perfect whole. Some canals could take boats no larger than 7 feet beam and 3 feet 8 inches draft; others took boats up to 12 feet beam and 4 feet draft. Locks were never uniform even on the same canal. The Thames and Severn canal built all but one of its locks 12 feet 9 inches wide; the remaining one it built a foot narrower, and consequently the extra foot was useless in all the rest. Some locks took boats 76 feet long; some could accommodate nothing longer than 53 feet.

On these canals the cargo barges, the "flats" dragged by horses or human trackers, rarely made more than $2\frac{1}{2}$ miles an hour. The passage boats, carrying passengers, frequently made four or five miles an hour. Not until it was too late did the canal companies consider the use of steam traction.

The Coming of the Railroad and the Telegraph

It was just as the third decade of the century ended that both the English turnpike trusts and the English canal companies began to fear and feel the competition of a new type of transportation,

the railroad, the most pregnant invention of the nineteenth century. Roads on rails, known as "tram roads," were of rather early origin. It is asserted that in the reign of Charles I one Master Beaumont, a gentleman of great ingenuity and rare parts, sank and lost £30,000 in a colliery enterprise at Newcastle, one feature of which was a tram road of plain wooden rails. In the eighteenth century roads made of rails were used extensively in connection with collieries and as feeders to canals. The rail was sometimes covered with iron; about 1750 iron-wheeled wagons were tried. Between 1767 and 1776 cast-iron plate rails appeared, with a vertical flange on the inner side of the rail to keep the wagon wheel in position, and in 1789 at Loughborough experiments were made with edge rails upon which the wagons were kept in position by flanges on their own tires. During the war with France there was considerable building of tram lines particularly in the industrial districts of Wales, where by 1815 there were 150 miles of tram roads, one of them twenty miles in length. In the region around Newcastle on Tyne there were 225 miles of iron road, and considerable stretches ran through the coal, iron, and timber districts of the Forest of Dean. In 1801 a road for general traffic, open to the public, was built from Wandsworth to Croydon, outside London. The statute authorizing it shows that it was thought of as another type of roadway on which the public might run their wagons. This act is important because it was the model for all later parliamentary statutes. Other short lines for general traffic also were projected and even built without attracting much notice.

Horses then provided the motive power on most of these lines. Early in the nineteenth century Richard Trevithick was experimenting with non-condensing steam engines which, working at higher pressures than the Watt engine, could be made with smaller cylinders and would therefore be lighter in weight. Trevithick's notion was that such an engine, placed on wheels, would pull more than its own weight. In 1802 he built a "road locomotive," which, adorned with a great dragon head, alarmed people as it spouted fire and steam on the roads around London. In 1804 he placed one of his road locomotives on rails on the Cardiff and Merthyr road in Wales.

A red herring was drawn across the trail of real advance shortly after this by the suggestion that smooth-wheeled locomotives could not pull a load on smooth rails. To meet this objection

Blenkinsop, in 1811, built his rack and pinion locomotives, which even foreign princes made pilgrimages to see. Though a number of locomotives of various types were built in these early years of the century, no one saw the essential connection of the locomotive and the rail road. As a matter of fact the cast-iron rails which were in use were too brittle to stand the grind of locomotive engines, and it was not until the rolling mills succeeded in turning out a heavy wrought-iron rail to replace the cast-iron rail that the locomotive was practical on rail roads. A patent for this type of rail was taken out in 1820, and with this all the elements of the railroad were in existence.

In the opening years of the century William James, a land agent and surveyor, was dreaming of a "general railway company" with a capital of £1,000,000. He suggested to the Prince Regent that locomotives might be used for the conveyance of passengers, and he argued with George Stephenson, who in 1814 built a locomotive, *The Blücher*, that speeds of twenty or thirty miles an hour might be attained. Stephenson himself was then thinking of only eight or ten. Years later William Huskisson, president of the Board of Trade, stood aghast at the smoke and noise, the hiss and whirl which locomotive engines passing at the rate of ten or twelve miles an hour would occasion. He asserted that neither the cattle plowing in the fields nor grazing in the meadow could behold them without dismay. In 1821 came Thomas Gray's *Observations on a General Iron Railway or Land Steam Conveyance; to supersede the Necessity of Horses in all Public Vehicles; showing its vast Superiority in every respect, over all the present Pitiful Methods of Conveyance by Turnpike Roads, Canals, and Coasting-Traders. Containing every Species of Information relative to Railroads and Loco-motive Engines*. The book with this enormously long, but descriptive title ran through five editions in five years.

While the public was discussing locomotive engines, how they would get up hill, how they would be able to stop when going down hill, and what they would do if a cow got in the way, the businessmen of Stockton and Darlington were studying several projects, one for a canal and another for a railway, for securing a better outlet for the minerals of southern Durham and northern Yorkshire. On the basis of the report of the engineer Rennie, they decided to build a railroad. It is interesting to note that when the route was surveyed the protests of the Duke of Cleve-

land that the line would spoil his fox covers led to changes in the survey. Finally, in 1821, after a campaign of education, a charter for a railroad was requested from Parliament. The lead was taken by Edward Pease, who became the head of the Stockton and Darlington Railway Company, which was authorized to construct the line. The charter contained no provisions for the use of locomotives, since it was the intention to work the line by horses. But in 1823 Pease became interested in an engine which Stephenson had built at Killingworth colliery, and he began to favor the use of a locomotive on the new line. The charter of the company was amended to permit the use of both locomotive and stationary engines.

The first locomotive for the new company was built by George Stephenson. The engine and tender, weighing 15 tons, could haul 48 tons on the level at 5 miles per hour. The chimney of the locomotive got red hot as soon as any speed was attained and the running expenses were so high that the company almost decided to abandon locomotives. Hackworth's *Royal George*, another locomotive purchased by the company, was, however, more economical. Even after it decided to use locomotives, the company did not intend to rely on them entirely. Several stationary engines were installed to help pull the trains up inclines by means of great ropes. Horses were also employed. In spite of an assertion by Nicholas Wood, a recognized railway authority, that nothing would do more harm than the promulgation of such nonsense that locomotives would travel at the rate of 12, 16, 18, or 20 miles an hour, when the *Quaker Line*, as the Stockton and Darlington was called, was opened on September 27, 1825, one engine made 15 miles an hour.

The Stockton and Darlington Company did not count much on passenger traffic, but from the first a certain number of passengers insisted on being carried. On October 10, 1825, the company began to run a daily passenger coach, named *The Experiment*, to carry six passengers inside and from fifteen to twenty outside, making the journey from Darlington to Stockton and return in two hours. Before long several coach proprietors were operating coaches, paying the company for the use of the tracks. These were drawn by horses. It was not until 1834, after the company bought out the coach proprietors, that locomotives were used to

draw all passenger coaches. By this time the company was running six coaches a day.

As Wordsworth wrote in his Sonnet of 1833:

Time

Pleased with your triumphs o'er his brother Space,
Accepts from your bold hands the proffered crown
Of hope, and smiles on you with cheer sublime.

The possibility of rapid travel had created among the people a desire to travel, and had given them a mobility which as Matthew Arnold declared was the end forever of "feudality." Worried physicians might write learned monographs on the horrible headaches which traveling in railroad trains would bring on, and sensitive moralists might be concerned about the dangers which beset ladies as trains went through the dark tunnels unless they put their hat pins into their mouths; yet the exhilaration of whirling through space and of seeing new scenes made people everywhere fling caution to the winds in their eagerness to ride the new trains. In the early 1840's Thomas Cook, a Baptist missionary and temperance lecturer, began to arrange special excursion trains to satisfy the popular desire to travel.

The immediate success of the Stockton Darlington Company led the businessmen of Manchester and Liverpool, for years at the mercy of the high freight rates of the canal companies, to resolve to build a railroad between the two cities. The company received its charter in 1828, after a previous refusal. The consulting engineers thought stationary engines and cables the best motive power if the line was to be heavily worked at once; if the directors intended to proceed slowly, then locomotives might be used on the levels and stationary engines on the inclines. In October, 1829, the company held a competition of locomotive engines at Rainhill. Stephenson entered his Rocket engine, which won the contest. When the line was opened in 1830 the Rocket drew the first train. William Huskisson, stepping into the way of the train as it came along at 15 miles an hour, was struck by it; and as he was being rushed to receive medical attention, the Rocket made 30 miles an hour. Epochal as the Rainhill trials and the Rocket's performance in 1830 were, the victory of the locomotive was not yet recognized. As late as 1834 the directors of the Newcastle-Carlisle Railroad were still discussing the use of horses.

In fact their charter, granted in 1829, prohibited the use of locomotives. The discovery that the cost of additional sidings, necessary if horses were used, was excessive decided the directors to ask Parliament to repeal the anti-locomotive clause. When the line was opened on March 9, 1835, two trains ran over the line; one was drawn by Stephenson's *Rapid*, the other, by Hawthorne's *Comet*. There was nothing more heard of horses after that as motive power on the railroads.

Down to 1835 the construction of railroads was small. Early promotion was usually the work of little groups of local businessmen seeking better outlets, stirred up, often enough, by the enthusiasm of engineers looking for a chance to build a road. The first roads were generally short, ranging from $3\frac{1}{4}$ to $11\frac{1}{2}$ miles in length, with a capital of from £33,000 to £5,000,000. During 1836 and 1837 there was great activity in projecting new companies. Some of the wildest schemes were put forward, including five separate roads from Brighton to London and three from Norwich to London. The panic of 1837 wrecked many of the projects, but the completion of the promotions of 1836-1837 kept men busy for the next five years. By 1838, when the London and Birmingham Railroad was opened, there were 500 miles of line, of which the London and Birmingham and its continuations accounted for half. Each year saw some new wonder completed. The Littleborough tunnel on the Manchester and Leeds was a mile and three-quarters long. The Box tunnel on the Great Western was 250 yards longer. In July, 1841, one could go from London to Newcastle in 17 hours—by rail to Birmingham, Derby, York, and Darlington and by coach thence; and from London to Glasgow in 24 hours—by rail to Preston and Fleetwood via Birmingham, by steamer from Fleetwood to Ardrossan, and by rail again from Ardrossan to Glasgow. "What more can any reasonable man want?" By the end of 1843 there were 1952 miles of line open, and little unfinished work projected. Many folk thought that the railways were nearly complete.

As a matter of fact the building of railways had scarcely started, as was made evident by the burst of activity in promotion in and after 1844. Acts of 1844 authorized the construction of 805 miles of line; those of 1845, 2700 miles; of 1846, 4538 miles; of 1847, 1354 miles. So rapid was the construction work which went hand in hand with the organization of projects that by the end of 1848

a round 5000 miles of railway were in operation in Great Britain. Another characteristic feature of these years was the tendency to form the short local lines into great systems. In the North, George Hudson united a number of small railroads into the Midland Company. Further south the Manchester and Liverpool, the Manchester and Birmingham, and the Birmingham and London were amalgamated into the London and Northwestern system with 379 miles of line. Other mergers created the Lancashire and Yorkshire; the London, Brighton, and South Coast; and the Northeastern companies. The Great Western Railway, joining London and Bristol, was the only great road originally conceived as a whole. It was on this line, incidentally, designed by Isambard Kingdom Brunel, that the wide 7-foot gauge was used rather than the much less satisfactory four-foot-eight-and-one-half-inch gauge which was finally accepted as standard.

Nearly all the companies had experiences similar to the Stockton and Darlington in regard to the nature of their business. They counted on freight traffic and found that the bulk of their revenues came from passengers. In view of this development the railway companies built elaborate stations, waiting-rooms, and buffets. Unfortunately the spirit of snobbishness was still so much in the ascendancy that while much attention was paid to first-class passengers, there was little, almost no, regard for the amenities of third-class travel until much later. The age of democracy had not yet arrived in the sense that corporations realized that smaller revenues collected from millions of passengers gave greater profits than large receipts from a tiny fraction of the population.

There were certain very significant differences between the history of the English and of other rail systems. In England the companies had to fight the bitter opposition of the canal companies who sought to prevent any invasion of their monopoly of freight traffic. Supporting the canals were the gentlemen who resented the noise and roar of trains as an unmitigated nuisance or who feared the ruin of the prospect of the countryside by railroad tracks, cuts, fills, and viaducts. Initial expenses merely for obtaining charters were extremely high, the companies were mulcted for the land they had to buy, and to allay public fears they had to build the most solid and expensive roadbeds. In America, to give but one example of a contrasting development, the railroads were enthusiastically promoted by business and politi-

cal leaders, charters were made available freely, and land for the right-of-way was in many cases donated. The later railroad companies were even subsidized by the grant of alternate square miles of public lands to encourage their construction.

Closely associated in point of time with the building of the first railroads and part of a similar desire to lessen the effects of distance were the invention of the electric telegraph and the construction of a network of telegraph wires over Europe and over America. Experiments in carrying signals over wires by electrical means had been made in England, America, and Germany during the 1830's, and success was achieved by a number of investigators. The best methods, by general agreement, were those worked out by S. F. Morse, an American, and his system of electric telegraphy was the one universally adopted. He applied for his patent in 1837, received it in 1840, and, aided by a congressional appropriation, opened his first telegraph line from Baltimore to Washington in 1844. In 1843 a telegraph line was opened between Paddington (London) and Slough in England. In 1851 a submarine cable was laid between England and France, and visionaries were even thinking of electric telegraphic communication between Europe and America. This did not come, however, until 1866.

The railroad together with the telegraph rapidly made changes of the most fundamental character in the nature of western civilization. Messages could be sent instantaneously between distant places; news was known when it happened or the day afterward through the newspapers. Instead of a breakneck 10 miles an hour on the fast mail coaches or a leisurely 40 or 50 miles a day in a private carriage, travelers now averaged from 29 to 36 miles an hour by train. In special runs remarkable records were made. In 1848 the *Great Britain* train did 53 miles from Didcot to London in 47 minutes. The nervous reactions of European peoples were speeded up, and what would have been fast beyond imagination in 1815 was intolerably slow in 1850. Not only did men like Thackeray complain of the slowness of trains, but the well-known railway joke of the sixteen-year-old boy detected traveling for half-fare, who explained that he had been under twelve when the train started, indicates how truly popular the intolerance of the slow trains was.

More specifically the railroads brought with them a new extension of the market. By bringing consumer and producer more

closely together and by extending the effective area from which supplies could be drawn and over which products could be distributed and sold, the railroad quickened demand and production to an unprecedented degree. But apart from their contributory effects upon nineteenth-century life, the railroad and, to a smaller extent, the telegraph directly introduced a new scale of business operations. Investment in the past had been in terms of thousands of pounds, or, at the most, of hundreds of thousands or a few millions. Several of the English canal companies were capitalized at a million pounds each. The new railroad companies which applied for charters in the three years from 1844 to 1847 had an authorized capital of £180,138,901.

Every market which the railroad entered as a purchaser of supplies was stirred into vigorous life. Timber and upholstery for carriages, building materials for stations, machinery for locomotives, coal to run the trains, and iron for rails and rolling stock were in demand in unprecedented quantities. The demand for materials for railroad construction was one of the major stimuli to nineteenth-century business. Treitschke, the German historian, declared that the railroads changed the whole face of the land and "first dragged the [German] nation from its economic stagnation." Disraeli, in his novel *Endymion*, attributed to the construction of the railroads the whole causation of the great period of prosperity which began in England in 1843 or 1844.

In connection with the railroad construction of the period from 1815 to 1850 there was set going in the industry of that period a rhythm of rapid expansion followed by periods of slack work and the search for new business which was to become characteristic of the nineteenth and early twentieth centuries. This can be illustrated by a brief description of what happened in connection with railroad building.

The railroad may be regarded as a mechanical invention, or rather as a combination of a series of inventions which satisfied certain latent human needs. So keen was the desire to ship freight quickly and to travel rapidly that there was almost instantly developed a tremendous demand for railroad construction. To satisfy this demand producers of every kind of material entering into railroad work enlarged their output. Contracting firms came into existence, engineers were trained, and thousands of a special type of railroad construction workers known as navvies were recruited

to build railway lines as fast as possible. At this rate there soon came into existence a capacity for building railroads which, when the construction already completed seemed adequate to the needs of the moment, could not be utilized at home. The next step was to participate in construction abroad. English enterprise was especially keen in this direction, and before 1850 English businessmen were utilizing English railroad building capacity in the construction of lines in the United States, France, Belgium, Holland, and elsewhere. Work of this kind involved, of course, the export of British materials, against which, in a general way, there were high tariff duties in the countries to which they were sent. Consequently English business interests joined in efforts to bring about freer trade throughout the world. No better way of doing this seemed to offer itself than to set a good British example by abandoning the English protective system. Other nations, moreover, glad to avail themselves of British materials and British experience, consented to open their ports to British imports, until such time as their own manufacturers could supply home needs. The British then had either to shut down their plants or to find other markets, which were eventually to be sought in the colonies. But there was never a thoroughly satisfactory solution of what should be done in the matter of surplus productive capacity built up to introduce quickly a new mechanical device of a major sort.

Ocean Shipping: The Improved Sailing Ship and the Coming of the Steamship

What the railroad did in internal and overland trade was paralleled in coastal, intracontinental, and in intercontinental communication and transport by the scientific study of navigation, by improvements in ship design, the perfection of the sailing ship, and the coming of the steamship. The steamship was really only in the experimental stage until after 1860, and consequently the major interest of the period under discussion centers in the sailing ship. It must be remembered that total tonnage was still very small, that ships themselves were small, and that England was still a hundred days from China by sea. Consequently there was in overseas commerce no such transformation as that brought about by the railroad on land.

The development of navigation as an exact science was begun by the officials of the British East India Company, who went through thousands of log books of their India voyages to obtain data for sailing directions and ocean routes. Their work was continued by James Horsburgh (1762-1836), who studied the log books of the Dutch East Indiamen, and by Lieutenant Matthew F. Maury of the American navy. After a stagecoach accident in 1842 which incapacitated him for sea duty, Maury turned to the study of the winds and the ocean currents of the Atlantic and the preparation of ocean charts. In 1855 he published his *Physical Geography of the Sea*, the first important work on modern oceanography. In 1854 the British Board of Trade began the publication of its great ocean maps, showing all known factors in small sections of the oceans of the world.

In 1815 Great Britain unquestionably dominated the seas with her "vast" aggregate of 2,200,000 tons of ships. But these ships represented little recent advance in design. The average London-owned ship was 215 tons burden; the average British ship was half this size. Apart from the cumbersome, luxurious, money-eating 1500-ton East Indiamen of the British East India Company there were few ships over 500 tons burden, and all were slow and inefficient. The improvements made by American and French designers in the eighteenth century in their search for speed to enable their ships to prey on British commerce and escape the British warships were elaborated in the Baltimore clippers and in the 450-ton Yankee Medford-built East Indiamen which, with a crew of 18 men, carried half the cargo of the 1500-tonners of the East India Company with their crews of 150 men. In the early 1820's came the Salem (Massachusetts) clippers which made the voyage from China to the United States in 78 days, and from China to Great Britain in 89 days. In 1832 there was launched in Baltimore the *Ann McKim*, the first true clipper ship, a vessel of 493 tons.

The clipper represented the highest development of the sailing ship. It was long and narrow, with a fine bow and the greatest beam aft of the center. A clipper was generally full-rigged, with three raking masts, carrying, beside topgallant and royal sails, extra sails known as moonrakers and skysails as well as studding sails. In 1846 Donald Mackay, the most famous of all clipper ship designers, launched his *New World*, the world's first three-deck ship

and the largest ship built to that time. The discovery of gold in California spurred the building of clippers, as did the demand for better time from England to America across the North Atlantic. In the early 1850's Mackay built the *Staghound* (1850), the *Sovereign of the Seas* (1852), and the *Great Republic* (1853). Between 1854 and 1856 he built four clippers for the trade between England and Australia, of which the *Lightning* was the most famous. On March 1, 1854, this ship sailed 436 nautical miles in twenty-four hours, at the rate of 18 to 18½ knots an hour. Other clippers hold almost equally remarkable records. Among them the *James Baines* sailed from Boston to Liverpool in 12 days and 6 hours. The British, of course, soon built clippers of their own, some of which, like the *Thermopylae* and the *Cutty Sark*, hold a famous place in nautical annals. The clippers were not large ships as size is regarded today, but they were larger than other ships of their time. Mackay's *Sovereign of the Seas* had a tonnage of 2421 tons. The *Thermopylae* was 212 feet long, 36 feet beam, and 21 feet deep in the hold.

By 1850 Great Britain had a mercantile navy of 3,396,000 tons of sailing ships and 168,000 tons of steamships. Not much less than 60 per cent of the ocean tonnage of the civilized world was under British registry. The most significant thing about the figures is the small extent of the steam tonnage. Although Fulton had put the *Clermont* on the Hudson in 1807, and Bell, the *Comet* on the Clyde in 1812, the steamship caught on but slowly. As early as 1819 the *Savannah* had used steam as auxiliary power to cross the Atlantic. In 1838 four steamships made the transatlantic passage; among them the *Great Western* designed by Brunel especially for ocean service. The only one of these four ships to remain in regular service continued to lose money for her owners. The average tonnage of steamships in 1847 was but 125 tons; they were used chiefly on lakes and rivers and in the coasting trade. Ocean steamships were exceptional.

Even slower than the introduction of steam was the use of iron for the hulls of ships in place of wood. Wilkinson had built an iron ship in the eighteenth century. Iron canal barges were used early in the nineteenth. In 1822 Aaron Manby built an iron steamer in sections, which was put together at London and navigated down the Thames and up the Seine to Paris, but the event

did not fire the popular imagination. John Laird of Birkenhead and his brother built a few iron boats, notably the *Alburkah* steamer, in which in 1832 Macgregor Laird sailed up the Niger River in Africa. During the 1830's Fairbairn opened his Millwall yard to build iron ships and Robert Napier began to build iron ships on the Clyde. In 1846 the Thames Ironworks was founded, and in 1847 the Patersons of Bristol built the iron steamship *Great Britain*, with engines of 1200 horsepower. By 1847 it is doubtful if as many as 150 ocean-going steamships had been built, and a large part of these had been constructed only during the past five years. One expert had already declared that "eventually all steam vessels would be built of iron," and it was believed that the "archimedean screw" or propeller answered better in an iron than in a wooden hull. Yet the chief interest in marine engineering as late as 1850 turned, not on iron construction, but on the costs of live-oak, tree nails, shipwrights' labor, and teak ships, and on the competition of the deadly efficient and marvelously well-built Yankee clippers. Wooden hulls and sails decidedly still dominated the world of shipping in 1850.

Inter-European and transatlantic trade still constituted the bulk of the world's commerce. After 1838 there was regular steamer service from Liverpool to New York, and shortly afterward the Cunard Line, the Collins Line, and other companies were organized. There had been romantic developments elsewhere. The British East India Company lost its monopoly of the trade with India in 1811, and private traders crowded Indian ports, bringing with them cotton goods of such quality and cheapness that the native manufacture yielded before them. To supply the demand for a fast mail and passenger service to India, the Peninsular and Oriental Steamship Company rather early put on a line of boats across the Mediterranean to Egypt and another line down the Red Sea to India, with arrangements for transfer over land between the two. The China trade remained a company monopoly as far as England was concerned until 1833; but the shrewd Yankee traders discovered that they could ship English cargoes and trade them in China. As a result, during the early 'twenties Salem and Boston added the profits of the China trade to the wealth they had won by their enterprise in defying British and French prohibitions during the war. Before long they were exterminating

the sea otter on the California coast to sell its rich furs to the Chinese mandarins; they even cut ice on Fresh Pond near Boston, cased it in sawdust, battened down their hatches, and sold it all over the Far East as a precious ingredient for long drinks. All China trade was at first restricted to Canton. After 1842, as a result of the Opium War, five treaty ports were opened, and Hong Kong was ceded to Great Britain. In 1858 further trade privileges in China for foreign merchants were won. Japan remained almost hermetically sealed to foreign trade during the first half of the nineteenth century. In 1854 Commodore Perry, who had visited Yedo with an American fleet in the previous year, negotiated a treaty with Japan by which Japanese ports were opened to the trade of the western world.

In the story of the development of shipping other major contributions consisted in the regularity of sailings which became a feature, the lower freight rates, easier entry and departure from ports, and all-year-round schedules. The improved sailing ships and the new steamships put merchants into contact with their markets more easily, more quickly, and more cheaply and thus contributed greatly to the expansion of British commerce.

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Chapter 23

THE FACTORY, BANKING, AND EXPERIMENTS WITH SOCIAL READJUSTMENTS, 1815-1850

Progress in the Manufacture of Consumers' Goods

TO APPRECIATE the real extent of mechanical progress in the first half of the nineteenth century, it must be kept in mind that the machine and the factory in the textile trades continued to be improved and extended along the lines laid down in the eighteenth century. In a general way technical progress here involved the more complete supplanting of human skill by ingenious mechanisms and an increase in the rate of speed at which machinery was operated. Both these processes made inevitable the more extensive use of steam power. The domestic workshops tended to diminish in numbers before the advance of the factory, and the factory became a larger unit. The individual entrepreneur was replaced by the partnership, and already there were demands that old laws against joint stock companies should be repealed so that the capitals of many investors could be drawn into industrial enterprises. Everywhere the larger operations were on such a scale that even the soundest companies could not finance them from their own resources, and credit provided by great banks, which mobilized the capital resources of a nation or a district, became a vital part of the industrial process.

Although much had been done to transform cotton spinning into a machine trade during the eighteenth century, cotton spinning still demanded much skill on the part of the operative who tended the machine. There were plenty of wooden jennies, turned by hand, in use in the mills of Lancashire as late as 1824, and they

had not disappeared by 1833. Much early machinery made of wood with metal working parts was still in use. In the early 1820's in England the increase in the number of mules led spinners to take advantage of the situation to demand higher wages. As a result, attempts were made to make the mule completely automatic. In the years 1825-1830 Messrs. Sharp and Roberts of Manchester patented and perfected a self-acting or automatic mule which dispensed with skilled labor and turned out stronger and more uniform yarn. Its use was at first restricted to the more progressive mills.

In the weaving trades nearly all work was done by hand until 1822. For though Edmund Cartwright had worked out the principles of the automatic power loom as early as 1784, his invention could not be used practically until it had been refined and a number of subsidiary inventions for treating the yarn had been worked out. In the early 1820's practicable power looms and yarn dressing machines were placed on the market. Handlooms still held their own and seem even to have increased in number for a time. Yet as the power loom became more perfect, the hand weavers could not resist it. They waged a losing fight against it, accepting lower and lower wages. Eventually many of the handloom weavers died of starvation; and the weaving of cotton cloth, like the spinning of cotton yarn, was brought completely into the factory. In the woolen textile trades factory processes wiped out domestic industry more slowly, and the knitting trades, though they still remained in the hands of domestic workers in England, were destined before long to be brought within the scope of the factory system.

Though the export of British machinery was subject to legal restrictions until Robert Peel became prime minister in 1841, there had been a great deal of exportation nevertheless, and English machine builders had set up factories to make English machines in France and Belgium. Moreover, English entrepreneurs came to America in considerable numbers, particularly to Philadelphia and to New England, to set up factories and install in them machinery on the English model. The consequences were that the English methods in the textile trades were rapidly adopted before 1850 all over Europe and America, and everywhere cotton and woolen cloth were being produced in quantities for mass consumption. It was for the first time possible for the "poor" of

Europe to be decently clothed. The use of cotton for underclothing was particularly important because cotton could be washed easily, and its widespread use made for improved cleanliness and better health among all classes. It was no longer the practice for wives and daughters of even well-to-do people to wear leather stays and quilted woollen petticoats, which would be worn without washing for years until they rotted to pieces.

From another, more limited point of view also, the cotton trade had great significance. Cotton products represented the greatest bulk of consumers' goods in the years from 1815 to 1850, and the industry achieved the highest degree of geographical concentration found in the first half of the nineteenth century. The cotton interest, therefore, wielded exceptional influence in British economic policy. British cotton goods and cotton yarn for years constituted almost half of British exports. The advances in cotton had been so tremendous that contemporaries focused their attention on them and glorified them as the greatest of British achievements. Andrew Ure's *Philosophy of Manufactures* is a panegyric of the cotton industry. It is small wonder that the Manchester cotton manufacturers were powerful enough to dominate domestic politics and that questions relating to their markets abroad were of major importance in England's foreign affairs.

The Size of Industrial Undertakings

Yet here again there must be no confusion between the industry of the present time and the factories of the early nineteenth century. In the largest industrial plants of the present day, such as the Rouge River works of the Ford Company, 120,000 workers are employed in single units. The largest English cotton firm of 1815 employed 7000 men. Of these 700 were spinners, working in four factories; the rest were domestic outworkers scattered all over the countryside. Forty-one Glasgow cotton factories averaged 244 workpeople each. Forty-three important mills in and about Manchester averaged 300 workpeople each, although two firms of this number each employed more than a thousand hands. These are figures for groups of large mills in 1815. Twenty years later, after many small mills had been squeezed out, the average cotton mill employed from 150 to 200 persons. The great pottery works of the Wedgwoods at Etruria employed 387 persons in 1816

and the second largest shipyard on the Thames, 230 in 1825. As late as 1850 the average British coal mine employed eighty men, women, and boys, above ground and underground. Ten mines had nearly 170 workers to a mine. The iron works, which in 1812 required as much as £50,000 capital to set up, had from 700 to 1300 men on their payrolls in all departments from smelting to fabricating. Anthony Hill, at the Plymouth Works, Merthyr, had seven blast furnaces, and puddling furnaces to match. Fifteen hundred men prepared 20,000 tons of bar iron a year. The London Gaslight and Coke Company, organized in 1822 with a capital of £580,000, had 3 gasworks and 126½ miles of gas mains, and other gas companies which were being formed had relatively large capitals.

In those industries which had not been revolutionized by adopting machinery and the factory system, the use of steam power was almost unknown, and even in the others the amount of power used seems curiously small to modern students. There are no complete figures available showing the use of steam power in Great Britain before 1850, but certain illustrations may be regarded as typical. In 1831 Glasgow contained 200,000 people and 328 steam engines. Of these 60 were on steamboats, of which one, of 387 tons, had two engines of 110 horsepower each. The remaining engines were all in the 107 power-driven cotton mills, many of which contained several engines. The average output of the 328 engines was 25.6 horsepower; the total power developed would not have driven the student cars to a nine o'clock class in a good-sized American college of today. In 1834 the British cotton factories used 30,000 horsepower of steam and 10,000 horsepower of water development. By 1850 the figures were 71,000 and 11,000 horsepower respectively, divided among 1800 cotton factories, employing 328,000 workers. This works out at an average of 45.5 horsepower per factory. In 1907 British cotton factories used 1,239,212 horsepower of energy, out of 10,755,009 horsepower generated in the country. Other textile factories in 1850 had 34,000 horsepower of steam and 13,000 horsepower of water development. Few industries outside the textile trades, metallurgical works, and pumping plants made any use of the steam engine even in Great Britain. Almost as remarkable as the progress made in the use of steam power in the textile and metal trades was the backwardness of other industries in adopting steam.

Banking During the First Half of the Nineteenth Century

The progress of commerce and industry was closely dependent upon the development of adequate banking and credit facilities. Manufacturers, for example, who had invested their capital in buildings and machinery relied upon loans from banks to purchase raw materials and to meet pay rolls until their goods were sold. Even the greatest merchants did not have sufficient funds to handle some of their consignments and depended on banks for credit. The availability of credit often determined the rate of expansion.

At the beginning of the nineteenth century British banking arrangements were quite unsatisfactory. Roughly described, banks in England were of two kinds at this time. The Bank of England was a joint stock company chartered by Parliament, receiving deposits of government and of other funds and issuing its own banknotes on the security of its deposits. It was the only joint stock company permitted to issue banknotes. Since a bank without banknotes was to men of that day unthinkable, the Bank of England was for practical purposes the only bank which could be organized as a joint stock company. All other banks were forced to use the partnership form of organization, which was limited to six members or less. Consequently the general run of banks was insufficiently capitalized and without adequate banking knowledge, skill, or experience. This was amply proven in crisis after crisis, when bankruptcy regularly decimated British banking houses. In 1826 Sir Robert Peel, then a cabinet minister, proposed to remedy the evil by permitting joint stock company banks to issue notes anywhere in England more than sixty-five miles from London. The Bank of England was permitted to establish branches in the provinces. Almost simultaneously Joplin, editor of the *Economist*, and Gilbart, the founder of the London and Westminster Bank, made the fateful discovery that the right to issue notes was not vital to a bank, since a grant of credit to be drawn upon by check answered every purpose of the banknote and did it better. In 1833 a parliamentary statute affirmed the legality of joint stock banks using checks. Shortly afterward the London and West-

minster Bank was founded as the first of the great joint stock banks which today dominate the English banking world.

Sir Robert Peel continued his interest in banking problems after the passage of the act of 1826. His final conclusions were that speculation and overdevelopment were responsible for the recurrence of banking crises, that these crises checked the supply of capital for industry, and that in this way trade depressions were brought about. His notion was to prevent financial stringency in the future by checking speculation, and this he hoped to accomplish through an 1840 edition of the planned economy which is known as Peel's Bank Act of 1844.

The fundamental design in the act of 1844 was the maintenance of credit and currency on a steady basis, so that rapid expansions or contractions would be impossible. This was done by separating the Bank of England into two departments, quite distinct from each other. Of these one received deposits; the other was entrusted with the right to issue banknotes. The amount of notes that could be issued was fixed at the value of the gold and silver which the Bank had in its vaults, in the proportion of four parts of gold to one of silver, plus an arbitrarily fixed sum of £14,000,000. Anyone could demand notes from the bank in exchange for gold at the rate of £3 17s. 9d. per ounce. Gold was to be sold by the bank in exchange for notes or checks at £3 17s. 10½d. per ounce. There could thus be no increase in the currency unless based on additional gold, while any reduction of paper would be countered by the issue of bullion. The note issue of other banks which already had this privilege was restricted in such a way as to rob it of any importance in expanding the currency and credit structure, since it could never exceed the average issue for the twelve weeks before April 27, 1844.

As the Bank Act of 1844 operated, it gave England a free gold market, stabilized banking practices, and gave England a sound paper currency. On the other hand, the act did not end speculation. Peel overlooked the significance of the deposit of credit and the check, and he could not know, of course, that in 1848 and in 1852 vast new supplies of gold were to be discovered in California and Australia which, increasing existing bullion at the rate of 5 per cent a year, provided a rapidly expanding basis for both paper currency and bank credits. The Bank Act of 1844 was, nevertheless, an important measure.

Price Changes and Their Effects, 1815-1850

The discussion in this chapter up to this point and in the previous one has been concerned with the major material elements in the economic progress of the period from 1815 to 1850. These were the road and the canal, the railroad, the telegraph, and ocean shipping, which gave improved transportation and enlarged the extent of the market; progressive agriculture and mining, which made available the basic materials for a more abundant life; the growing use of steam power and new machinery in industry which extended the supply of manufactured products; and the development of better banking institutions. The price changes which have already been described are another factor which contributed largely to the character of the life of this first half of the nineteenth century. These shifts had the effect of altering the proportions in the distribution of goods as between different classes. By increasing the purchasing power of the wage-earning masses, they provided a stimulus to the demand for goods, and thus a spur to industrial development, probably as significant as that furnished by the great new undertakings in railway, ship, and factory construction.

The Beginning of Factory Legislation

There were, in addition to these unconscious and unpremeditated gains by the masses of the people growing out of price changes in the thirty years after 1821, certain definite benefits consciously demanded on the one hand and consciously given on the other. These varied, of course, from country to country. In England, where the factory form of organization was most developed, they took the form of factory laws. The purpose of the English factory acts was basically to protect the workers from competing disastrously with each other for jobs by limiting and restricting certain groups on account of age or sex. The effort was made to exclude very young children from the factories altogether and to circumscribe the hours and working conditions of "young persons" (under 18) and of women. A second consideration was the creation of jobs for more men by forcing the general reduction of hours.

Since the whole of English social thinking at this juncture

rested on the idea that grown men were free to enter into any contracts that they pleased and that in the long run the unrestricted efforts of individuals to better themselves would contribute to the general welfare, it was not possible to argue the case strictly along intellectual lines. The emotional appeal is often more powerful than logic. The humanitarian traditions of the evangelical group of the eighteenth century were still very powerful in Great Britain, and among those who subscribed to them were men of great political influence. The proponents of factory legislation were astute enough to key their campaign on an emotional note and won concession after concession. There could be no answer to John Fielden's *Curse of the Factory System*, Hood's *Song of the Shirt*, and Elizabeth Barrett's piteous *Cry of the Children*.

Do you hear the children weeping, O my brothers,
Ere the sorrow comes with years?
They are leaning their young heads against their mothers,
And that cannot stop their tears.

They are weeping in the playtime of the others
In the country of the free.

After preliminary legislation in 1802 and 1819, which served to carry the Tudor precedent of the protection of the weak over the gap which separated sixteenth-century agrarianism from nineteenth-century industrialism, Parliament passed the first effective factory act in 1833. This act set up four inspectors to enforce its provision. Children under 9 were excluded from factories altogether; those between 9 and 13 were to work only 8 hours a day, and young persons from 13 to 18 years old only 12 hours a day. In 1842, in the face of the horrible reports of the conditions under which women worked in the mines, women's work was regulated. They were forbidden employment in the mines, and, in 1844, their work in factories was limited to 12 hours per day. In 1847 and 1850 the factory day for protected persons was fixed so as to run from six in the morning to six in the evening or from seven to seven. Since it proved unprofitable to have the men alone at work before or after these hours, the working day of men was also limited in fact, though not in law. Other acts of the time provided for the fencing of shafts and gears on machines. Factory

owners' opposition to such laws led Dickens to dub their association "The Association for the Mangling of Operatives," a phrase which in itself carried tremendous emotional appeal.

Popular Education

Another means through which the masses of the people participated in the distribution of wealth was the provision of facilities for popular education. During the eighteenth century Rousseau had awakened new interest in education, and Johann Heinrich Pestalozzi, trying to apply Rousseau's theories in the education of his own child and finding them impracticable, had evolved theories of his own. These are in reality the foundation of modern elementary education. Pestalozzi believed all social reforms could be brought about through the development, moral and religious, of the individual rather than through political revolution. He was particularly concerned with the education of the children of the working classes, and gathered a group of them in his own home. In the last two decades of the eighteenth century Robert Raikes, a Gloucester bookseller, stirred by the wretched ignorance of the children of the poor, began a Sunday School movement, which spread rapidly in England. Somewhat later Andrew Bell advocated, and Joseph Lancaster opened, a day school in which the older children, previously instructed by the teacher, taught the younger children. Lancaster's success with the monitorial system, as the method was called, led to the organization of the British and Foreign School Society to conduct schools under non-conformist auspices where Lancaster's methods were used. Shortly afterward, Anglicans founded the National Society for Educating the Poor in the Principles of the Church of England.

Jealousies among those who wanted to manage the education of the people together with traditions that mass education was not really necessary and might even prove undesirable, if it led people to read radical literature, prevented the inauguration of any state system of popular education until 1870. At the same time, beginning in 1833, Parliament began the annual appropriation of considerable sums to be used in the aid of schools conducted by the voluntary societies such as the National Society and the British and Foreign Society. The first grant, made in 1833, was for £20,000; in 1853 £260,000 was voted. The census of 1851 showed

46,042 day schools. But as one of the school inspectors charged with examining schools to see whether they qualified for a share of the government grant wrote, "Nothing can be more fallacious than statistical tables giving the number of children attending school if these numbers be read as an indication that so many children are receiving an education." Only a quarter of English children stayed in school more than two years, and from a fourth to a half never got beyond reading and writing.

Meeting Economic Fluctuations

The list of indirect benefits from the growing prosperity of the times received by the working classes of Great Britain might be indefinitely extended. It might include the introduction of sewers in the towns and the paving and lighting of streets, and the whole process of urban improvement which was a marked characteristic of the period. On the other hand, there were many checks and hindrances to comfort and happiness in the emerging age of industrialization. Of these the most serious was the lack of steadiness in the development of business, commerce, and industry. The recurrence of trade crises in the first period of the industrial revolution has already been noticed. The early nineteenth century saw not merely the continuation of these phenomena, but their intensification as business operations became larger and covered wider territory. Each new forward movement seemed to be followed by a setback which was accompanied by unemployment or slack work. The tendency seems to have been always to expand industrial facilities and commercial dealings just a little beyond the requirements of the time. More factories than were needed were built, and as soon as the market was saturated the plants were closed and workers, drawn in from all sorts of places, found themselves without jobs. A somewhat similar result showed itself when improved machinery, such as the power loom, displaced considerable numbers of hand weavers, or when industry moved from an old area to another better suited for it and left the workers of the first without work.

Another factor was the failure of harvests, with resulting shortage and high prices of food. This was still of great importance in view of the fact that nearly all food was locally grown.

There seems to be a close correlation between unemployment

resulting from depressions and the mass migration from the British Isles which was characteristic of this period. In 1815 the number of emigrants was 1889 persons. It grew annually. In 1830, 55,461 persons left the British Isles, in 1840, 88,785, and in 1851, 309,962, "an exodus which is, considering the volume of people from which it was drawn, probably without parallel in the history of any civilized country." During the thirty years from 1815 to 1845 English agricultural laborers and displaced and unemployed artisans and industrial workers seem to have constituted the bulk of those who left. The great potato famines in Ireland from 1845 onward, which brought death by starvation to hundreds of thousands, drove the Irish in multitudes to seek new homes overseas. Between January 1, 1847, and December 31, 1854, 1,656,044 Irishmen left their native land.

Down to 1820 nearly all British emigration went to North America, and down to 1833 Canada received somewhat more of the emigrants than did the United States. After 1834, however, the United States received a larger number than Canada. The vast majority of the Irish settled in the United States, where their hatred of agriculture showed itself in their settling in the cities, to become general workers, contractors, policemen, and politicians. Beginning in 1821 statistics of emigration to Australia appear. The annual numbers of emigrants thither was under 5000 a year until 1836; from 1837 to 1851 it averaged about 13,000 a year; and in 1852, with the discovery of gold in Australia, it rose to 87,000 persons.

In the large majority of instances those Englishmen, Irishmen, and other Europeans who sought escape from the hard times of their own countries improved their condition and gave their children better opportunities for a happy and successful life than they themselves had started with. They worked hard in the new lands which they colonized; they gave much, and if they received great rewards, they earned them. Certainly the history of the United States, of Australia, and of New Zealand could not have been written without them.

What of their friends and relatives whom they left behind in the old world of England, Ireland and the rest of Europe? What measures did they take to relieve themselves of the economic hardships which attended the progress of the time? It must never be overlooked that Britain, in common with the rest of Europe,

was not in a continuous slough of economic distress in the period from 1815 to 1850. She was making great strides in economic advancement. Her people, taken by and large, were better off, materially speaking, from decade to decade, even though at times trade recessions brought hardships and distress. Those who remained at home are therefore not to be regarded as a people without hope, crying out in their despair and clutching at anything which promised relief. Rather they must be considered as those who had tasted the joy of a more abundant life and were eager to speed up the coming of their heaven on earth.

Englishmen, particularly in the industrial regions of the north and west, continued their interest in trade unions. After their partial legalization by the acts of 1824 and 1825 a union of trade unions was formed in the early 1830's. It was known as the Grand National Consolidated Trade Union of Great Britain and Ireland, and its leaders proposed to supplant Parliament in economic matters by a House of Trades. There also appeared at this time the suggestion of a *grand national holiday* to enforce working class demands. Renamed the *general strike* by John Doherty, this device has made an appeal to the working classes in various quarters ever since. The unionism of the early 'thirties collapsed in the face of renewal of hard times and of employer resistance. Though the idea of the federation of all trade unions was revived in the 'forties, the future seemed to belong to a more conservative type of organization limited to groups of highly skilled artisans, such as machinists ("engineers"), carpenters, and cotton spinners. In their constitutions they subordinated trade policy to the furtherance of mutual insurance ("friendly society") programs and thus avoided the pitfalls of the act of 1825. During the 1850's and early 1860's the "New Model" unionism of highly skilled workers made considerable progress. New Model unions were more concerned with savings and mutual insurance projects than with strikes, yet they were highly organized and able to bargain collectively with their employers.

The appeal of trade unionism scarcely extended below the top crust of industrial workers. As many of those who thought about their difficulties at all saw the situation, the evils from which they suffered were political, that is, the result of law and governmental action, and such evils could be dealt with only by political measures. They were imposed by the government and relief could be

obtained only if the government were brought under popular influence or control. Consequently there was among the working classes a great deal of interest in political movements, which took such forms as chartism and the renewal of agitation for franchise reform. Socialism, however, attracted but few converts.

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PUBLIC FINANCE DURING THE EIGHTEENTH AND THE EARLY NINETEENTH CENTURIES

THE END of the seventeenth century saw two very important changes in public finance. Parliament assumed responsibility for the maintenance of the armed forces of the country. The notion that the king must live of his own was thus definitely abandoned. True, at first the king remained responsible for the support of the civil government out of revenues assigned to him; but as Parliament, still unwilling to pay generously, invaded the assignments by requiring that they too were to be used for military purposes, the Parliament eventually had to take over the support of the civil administration also.

In the second place it was discovered that public faith was a stronger thing than the word of a monarch and that by use of the public credit money could be raised quickly and easily for war purposes. During the course of the eighteenth century the British government exploited to a high degree the new found discovery that wars could be more readily paid for if the money were borrowed instead of being raised by taxation. Those who had funds could be induced without difficulty to lend them to the government in return for an annual interest payment coupled with a promise that the principal would some day be repaid. At the end of the War of the Spanish Succession the English national debt stood at £50,000,000. In 1738, the last year of the long peace of twenty-five years, it had fallen, thanks to some endeavor to make repayment, to £48,000,000. Toward the close of the Seven Years' War the total indebtedness of the nation had risen to £146,000,000 as the result of England's participation in

the War of the Austrian Succession and the Seven Years' War. The effort to induce the American colonists to shoulder a small part of the nation's fiscal burden was at least one cause of the American Revolution. That the attempt was unnecessary as well as futile is indicated by the fact that between the end of the Seven Years' War and the beginning of the American Revolution nearly £11,000,000 was repaid out of British revenues on the principal of the national debt. By the time the American colonies had been lost the debt had been increased to £240,000,000 (figures for the year 1785).

The National Debt

During the eighteenth century various experiments had been made in the raising of funds and the management of the debt. At first, in the latter part of the seventeenth century, whenever money was raised by way of loan, certain specific revenues, such as certain salt or customs duties, were earmarked to meet the payment of interest. Occasionally, at first, various lottery and bonus features were combined with the loans. In 1692 the government agreed to pay on a loan of that year 10 per cent a year until 1700, and 7 per cent after that date, with a division of the annuities of deceased subscribers among all who survived until only seven were left alive, when all payments ceased. In 1693 the Exchequer agreed to pay 14 per cent a year on any subscription on the life of any person indicated; the principal was extinguished and interest ceased with the death of the person. In 1694 a lottery loan of £1,000,000 was issued, bearing interest at 10 per cent for 16 years, at the end of which time the principal was to be considered repaid. There were, however, 2500 lucky numbers on the bonds, among the holders of which £40,000 in prizes was divided. The first number to be drawn brought its holder £1,000 a year for sixteen years.

In 1694 a syndicate of financiers, headed by William Patterson, agreed to lend £1,200,000 to the government at the then very moderate interest rate of 8 per cent, plus £4,000 annually for management, provided that they should receive a charter incorporating them as a joint stock bank, with the right to issue banknotes. The new corporation was the Governor and Company of the Bank of England. Actually the subscribers to the stock of

the new bank were called upon to pay only £720,000 of the sum which they advanced to the government. The balance was made up out of deposits in the new institution.

The idea of coupling a loan with the grant of a charter was very popular among London businessmen. Various schemes were brought forward, many of which were unsound or worse. In 1698 in return for a loan of £2,000,000 at 8 per cent, a group succeeded in securing a charter to set up a new East India Company, to rival the older organization trading to India. Eventually, in return for greater loans at interest of 5 and 6 per cent, the two East Indian trading companies were amalgamated into a united corporation. In 1712, when Great Britain secured the monopoly of the slave trade in Spanish America, a new company was chartered to exploit the concession. It paid for its charter by permitting government bonds to the amount of £10,000,000 to be subscribed in exchange for its stock. The company agreed to take 6 per cent on these subscribed bonds, plus £8,000 annually for management, a lower interest rate than the government was already paying. The block of bonds held by the company was to form the credit basis for borrowing working capital. The shareholders in the company expected that they would get larger dividends on their stock than they had formerly received on their government bonds because of the vast profits which it was believed the company would make on its monopoly of the Spanish slave trade and its other enterprises. In back of the whole arrangement was the idea of the "fund of credit." Businessmen had a notion that there was great value to them in a national debt, since the bonds could be used as a basis for credit. They argued that if a corporation could secure control of great masses of national bonds, that corporation could borrow money for business dealings on those bonds on very easy terms. It would have a "fund of credit" of the highest value. It could afford to accept a low return from the government on the bonds which it held, since it could raise trading capital on this fund of credit at still lower interest rates. The fund of credit was spoken of as "a mine of gold" and "realized alchemy." Wealth was supposed to be used twice. It was lent to the state, and the debt became the security for further loans. It was even thought that the process was capable of infinite extension.

In the years which followed the Peace of Utrecht, Robert Wal-

pole, then in the beginning of his career, toyed with several plans for repaying the national debt, or for lessening its burden upon the nation. In 1717 he set up a sinking fund of £1,000,000 per annum for the repayment of the national debt. Unfortunately for Walpole's fond hopes, later in his career when objections were made to increasing taxes, he met deficits by borrowing from the sinking fund, so that the net reduction of the debt was small.

Another plan which was much discussed at about the same time that the first sinking fund was established was one for the reduction of interest charges. Walpole's sinking fund scheme had a provision for the conversion of outstanding bonds for others bearing lower interest rates. Those who chose to convert their holdings were given new 5 per cent bonds; dissentients were to be paid off out of the sinking fund. But it was a grave question whether this could be done legally or ethically in the case of holders of certain securities such as the annuity bonds which were not redeemable at the pleasure of the government or at a definite date. Perhaps the holders of these obligations would exchange them for South Sea Company stock. In 1719 the South Sea Company carried through an operation by which holders of a lottery loan of 1710 at 9 per cent for 32 years were permitted to exchange these bonds for company stock on a very favorable basis. The present holders were to receive company stock having a face value of slightly more than their original subscriptions. Their income was in the future to be subject to the company's earning powers. The company was to receive 5 per cent interest from the government on the annuity bonds and to lend £500,000 to the government. To raise this sum new stock of the same face value was issued and sold at 114. The profit to the company on the transaction was £72,800. The original bondholder now had company stock; but he felt that the profits of the company would be so great that he would receive even more in stock dividends than he had received on his bonds.

The government saved so much in interest and the company gained so much in profits on its new stock issue that in November, 1719, a scheme was brought forward to convert the entire outstanding debt into South Sea Company stock. The year 1719 was one of grandiose financial schemes in Paris and other continental cities as well as in London, and the new plan was one of the most grandiose of all. For it envisaged the conversion of the

government bonds held by the Bank of England and the East India Company into stock and the transference of their business to the South Sea octopus. The whole plan ran parallel to Law's Mississippi Bubble which at the very moment had Paris by the ears.

The Bank and the East India Company were powerful enough to compel the South Sea Company to give up that part of the scheme relating to themselves; the South Sea Company limited itself to a plan to convert all other outstanding government bonds, to the value of £30,981,712 6s. 6¼d. A formal offer to the government was made in January, 1720. The company was to increase its authorized capital (already £11,746,844) by £100 for every £100 in government bonds subscribed. Until 1727 the state was to pay 5 per cent interest on such bonds as the company took over, and 4 per cent thereafter. For the privilege of making the conversion the company offered a bonus of £3,000,000. The saving in interest would be over half a million pounds a year; and if this sum were to be paid annually into the sinking fund, the debt would be extinguished in twenty-five years.

The Bank thought the privilege of making the conversion so valuable that it made a counter-proposition, offering a bonus of £5,000,000. The Bank and the company were now invited to make second offers. The Bank offered a bonus of £5,700,000 plus other valuable considerations; the company offered a bonus which worked out at £7,134,906 os. 4¾d. The company's proposal was accepted.

The directors of the company now engineered one of the greatest stock market swindles in history. By false reports of the future possibilities of their business, by declaring huge dividends out of money coming from stock sales, and by lending their own funds to speculators they drove up the market quotations on company stock to 890. When the operators began to cash in on their profits, the price fell very rapidly. Many people were bankrupted in the banking crisis which followed. The government, however, profited greatly by the scheme, in that the interest payments were permanently reduced.

All these early developments represented efforts of the government to find the best way of dealing with the national debt. Eventually relatively low interest rates for long periods and the repayment of principal at maturity were found to be the best

terms on which government borrowing could be conducted. In 1749 Henry Pelham consolidated all existing obligations into the "Consolidated Debt," the bonds of which were known as consols. These bore interest first at $3\frac{1}{2}$ per cent and later at 3 per cent. William Pitt the Younger started a new sinking fund. So certain was he of its operation that after 1793 during the war with France he indulged in unlimited borrowing in the fond hope that as long as the Sinking Fund were kept working it did not matter how large the debt was. At the end of the war with France, in 1815, the debt stood at £885,000,000.

Revenues During the Eighteenth Century

During the eighteenth century the government relied for its revenue funds chiefly upon customs, the land tax, stamp duties, and excises. The Crown lands were still in existence, but their revenue was unimportant in comparison with other sources of government income. The royal estates were so reduced by grants and sales that in the first twenty-five years of George III's reign the average rent was little more than £6,000 a year. Increases in land values of the London estates and better administration augmented the rents so that in 1830 the Crown lands produced £373,770. The Crown lands, incidentally, remained the property of the king, and the rents were used as part of his hereditary income, from which he met court and other expenditures. King George III surrendered his hereditary income for his life in return for a fixed grant to meet his civil list, and this practice has since been continued.

The land tax, established in its eighteenth-century form in 1692, brought in £2,000,000 a year when levied at 4s. in the pound of the annual value of land. Since it bore upon the landowning classes, it was scarcely capable of much development. Those who paid it, both disliked it and had a monopoly of representation in the House of Commons. Walpole reduced the land tax to a rate of one shilling in the pound and would have abolished it altogether if he had been able to increase the excise taxes sufficiently.

Walpole also tried to lower the customs duties on imported raw materials and on exported manufactured goods. For the purpose of making England an entrepôt for colonial and other wares he sought to replace existing customs duties on such articles

by an excise. In 1733 his excise scheme for wine and tobacco failed, owing to factious opposition. During the remainder of the century the customs were constantly increased, so that by 1784 in all 100 separate kinds of duties had been imposed. Of these 68 were still actually in force, and a single article imported or exported might bear as many as 15 of them.

William Pitt the Younger was interested in reforming the government fiscal system. Among other things, in 1787 he reduced and simplified the customs duties, but during the course of the wars with France his government increased them again so greatly that complaints against the customs became serious. As part of his reforms Pitt ended the practice of arranging government loans by private negotiations between ministers and bankers and put them out to public tender. To balance his budget he devised a whole series of direct taxes, such as taxes on servants, race horses, carriages, gold and silver plate, and windows in inhabited houses. He arranged that all government receipts should be paid into a single account known as the Consolidated Fund, and he created a body of five commissioners to audit public accounts.

The progress of the war with France ended Pitt's hopes of fiscal "reform." In 1797 he increased existing taxes and introduced an income tax on a graduated scale, payable on incomes of £60 per annum and over at rates ranging from two pence in the pound to two shillings in the pound on incomes over £200 per year. The greater part of the war revenue was raised by loans; and since Pitt insisted on keeping the interest rates low, the government had to submit to allowing heavy discounts. The average price which the government received for its loans was £60 for a £100 bond.

The excise duties and the stamp duties were likewise increased at every turn, so that Sydney Smith had a good deal of justification for his classic description of the average Englishman of the early nineteenth century.

We can inform Brother Jonathan what are the inevitable consequences of being too fond of glory. Taxes upon every article which enters into the mouth or covers the back or is placed under foot. Taxes upon everything which it is pleasant to see, hear, feel, taste, or smell. Taxes upon warmth, light, and locomotion. Taxes on everything on earth or under the earth, on everything that comes from abroad or is grown at home. Taxes

on the raw material, taxes on every fresh value that is added to it by the industry of man. Taxes on the sauce which pampers man's appetite, and the drug which restores him to health; on the ermine which decorates the judge, and the rope which hangs the criminal; on the poor man's salt and the rich man's spice; on the brass nails of the coffin and the ribbons of the bride; at bed or board, couchant or levant, we must pay. The schoolboy whips his taxed top; the beardless youth manages his taxed horse, with a taxed bridle, on a taxed road; and the dying Englishman, pouring his medicine, which has paid 7 per cent., into a spoon that has paid 15 per cent., flings himself back upon his chintz bed, which has paid 22 per cent., and expires in the arms of an apothecary who has paid a license of a hundred pounds for the privilege of putting him to death. This whole property is then immediately taxed from 2 to 10 per cent. Besides the probate, large fees are demanded for burying him in the chancel. His virtues are handed down to posterity on taxed marble, and he will then be gathered to his fathers to be taxed no more.

Fifty years later Lord Derby, looking back, summed up the situation early in the nineteenth century by saying, "With everything taxed that could be taxed, and an income tax of ten per cent, truly our grandfathers had something about which to grumble." The only alleviation in the tax burden that came with the end of the war was the repeal of the income tax which Pitt had imposed as a special war revenue measure.

Between the end of the War of the Spanish Succession (1713) and the beginning of the War of the Austrian Succession (1740) the public revenue ranged between three and four million pounds a year. Between the end of the Seven Years' War (1763) and the beginning of the American Revolution (1775) it was about £7,000,000 annually. From that time it rose rapidly, reaching £18,900,000 in 1792, on the eve of the war with France, £33,000,000 in the year 1800, £50,000,000 in 1805 and £71,000,000 in 1815. With the coming of peace there was a recession in public income. From 1820 to 1850 it was either just under or just over £50,000,000 a year.

In 1830, the national debt stood at £780,000,000, with an interest charge of £29,000,000 a year. The total public expenditure was £56,000,000 annually. Of this £16,000,000 went to the army and navy, £4,000,000 represented the costs of collecting the reve-

nue, and £7,000,000 covered the civil list, the civil services, bounties, pensions, and other charges. It has been estimated that the national income, the earnings and the profits of everybody in Great Britain at this time, stood at £300,000,000 a year. The tax charge was therefore about one-sixth of the total, and about one-twelfth of the total went back to a small class of bondholders in the form of interest on government bonds.

While at first sight the absorption of one-sixth of the nation's earnings and profits to pay the expenses of government may seem too great, economists are of the opinion it was not excessive, provided that the burden of taxation was evenly distributed. As a matter of fact, in 1830 in Great Britain it was not. Instead of being levied in accordance with ability to pay, taxes were imposed on consumption and on industry.

Taxes in the Early Nineteenth Century

The taxes on consumption took the form of excises and customs on semi-luxuries. The sugar tax yielded £4,500,000; the tea tax, £3,250,000; the coffee tax, £500,000; spirit duties on whiskeys, brandies, and rum, £7,500,000; the beer duty, £3,250,000; the wine duties, £500,000; the tobacco duties, £2,750,000; and the duty on currants, £250,000. Parnell, a liberal statesman and economist of the time, held that these taxes were all paid by the wealthier classes, since the articles taxed were used by the laboring classes to but a limited extent. His view suggests some dire things about the standards of living current among the working classes, who could not or were not supposed by a well-informed man to be able to afford sugar, tea, coffee, and currants in their buns.

The taxes on industry consisted in part of the duties on raw materials imported. Raw cotton (except that from the British Empire) paid a duty of 6 per cent, hemp, 12 per cent, and turpentine, between 30 and 40 per cent. Raw sulphur paid 10s. per ton; refined sulphur, £6 per ton. Coal, shipped coastwise from Newcastle, paid 5s. per ton at an English port and, up to 1824, if shipped to London it paid an additional 3s. 6d. per ton. Timber was so highly charged with customs that this single commodity yielded a revenue of over £1,500,000 a year, and in consequence Great Britain paid more for timber than any other country.

Then there were certain excises on industrial products, such as glass, paper, and printed calico. Up to 1829 and 1830 leather also bore an excise. While these duties did not yield much revenue, they did require the presence of corps of inspectors and the formulation of rules to prevent evasion of tax payments, which effectively prevented growth and development. For example, no plate glass factory could make crown glass. All glass had to be of a certain thickness and the pots in which it was made had to be of a certain capacity. Glass actually declined in use between 1813 and 1824.

Various suggestions were being made for a solution of the fiscal problem. Something had to be taxed if the nation was to continue to pay interest on the debt, support the army and navy, and maintain the civil government. Ricardo wanted a capital levy. Many urged the reimposition of the income tax at a rate of $1\frac{1}{2}$ or 2 per cent. McCulloch advocated the reduction of the interest rate on government bonds.

The burden of national taxation was rendered harder to bear because in addition to the national assessments, there were local rates, levied chiefly to support the Poor Law. In 1830 local rates raised £8,200,000, of which £6,800,000 were used for poor relief. It is estimated that in the country districts every agricultural laborer received one-fifth of his maintenance from the poor rates. Eight or 9 per cent of the whole population were kept alive by the poor rates. Malthus represented the feelings of the propertied classes extremely well when he declared, "There is one right which man has generally been thought to possess which I am confident he neither does nor can possess, a right to subsistence when his labour will not fairly purchase it. Our laws indeed say he has the right . . . we are bound . . . formally to disclaim the right of the poor to support." Malthus wanted to end the Poor Law completely for good and all. The politicians were not quite so heroic. In 1834 they eased the taxpayers' burdens by repealing the old Poor Law and substituting for it a new Poor Law which gave relief not as a matter of right but of expediency and required those who asked for it to enter a workhouse or poor farm. Here, under the commissioners of the new Poor Law, conditions were kept worse than the worst standards which prevailed among those who maintained themselves.

The repeal of the old Poor Law in 1834 gave a certain relief

from the tax problem by lowering local taxes, and it did not become acute again until the 1840's, when Robert Peel did two things. He greatly reduced all customs duties, and he imposed a new income tax. Peel's first reduction of the customs duties had a fiscal motivation. His predecessors in the Whig government of Lord Melbourne, faced by fiscal deficits, had increased all existing duties by 5 per cent, only to find that with higher rates, income fell. On the other hand, when the Tories had lowered duties in 1824 and 1825, larger revenues had been collected. Peel's purpose in 1842 was to increase customs revenues by lowering the duties. He expected a temporary recession in yields, and to tide this over he had recourse to the income tax. This was imposed in the budget of 1842 for four years at the rate of 7d. in the pound (14 cents in \$4.86 or about 3 per cent) on all incomes over £150. Actually, during the next eighteen years (1842-1860) many different categories of customs duties were entirely repealed. As a result, customs schedules yielding £8,950,000 annually were given up. In addition excises on manufactures yielding £4,080,000 a year were repealed, and stamp duties worth £500,000 a year revised out of existence. The substitution of a house tax for a window tax and the repeal of the auction tax cut off another £1,400,000. The income tax when levied at 9d. in the pound yielded £10,000,000. This, with an inheritance tax bringing in about £600,000 and increases of about the same sum in the probate and legacy duty, almost equaled the losses from the customs and other repeals and reductions. Although politicians talked for years about the temporary character of Peel's income tax, there was never the slightest prospect that it could ever be given up. In reality it became one of the chief sources of the public revenue of modern Great Britain. At the same time the customs and excise duties remained very important. While some of the rates of these duties were lowered or remitted, some were increased. Actually, the increases in the excises and customs paid on malt, spirits, sugar, tea, tobacco, and paper in 1860, as compared with 1842, were greater than the combined collections of the income tax and the inheritance tax.

The 1850's saw the beginning of a new upward trend in expenditures of the government due to the assumption of new functions and the rising costs of services. The larger part of the increases in outlay was met by the rising revenues, but considerable

funds were made available to be devoted to such purposes by savings on the charge of the national debt. Conversion of government bonds in 1822, 1830, and 1844 lowered the interest rate from 5 to 3 per cent. Between 1815 and the beginning of the Crimean War the debt was reduced by £60,000,000 through the operation of the sinking funds. Though the Crimean War added almost exactly the same sum to the debt, reductions were again effected during the second half of the nineteenth century.

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Chapter 25

FREE TRADE AND STEEL: THE ECONOMIC DEVELOPMENTS OF THE PERIOD 1850-1870

The Trend Toward Free Trade

THERE is always evident in historical development an interaction between economic changes and public policy. In some eras the stress is on the way in which economic changes influence the evolution of public policy; in others public policy and changes therein have a decidedly important effect on the form and direction which economic progress takes. In the period from 1850 to 1870 the latter proposition had considerable validity, and certain aspects of the economic life of the world were decidedly influenced by the prevailing notions of what constituted the best national policies.

Since England was the "Workshop of the World," that is, the leading manufacturing state, in the middle of the nineteenth century, English policy is of especial interest. Although in the *Wealth of Nations*, which was published in 1776, Adam Smith had picked out certain fallacies in the mercantilist philosophy, mercantilism continued to be the English trade policy through the first four decades of the nineteenth century. Agriculture was given a high degree of protection by means of the Corn Laws. Industry was permitted to import many of its raw materials free of duty and was guarded from foreign competition by duties high enough to exclude foreign manufactured goods and yet low enough not to lead to retaliatory measures against English exports. Shipping was encouraged by the Navigation Acts, in which, however, great breaches had been made by concessions to the United

States, Prussia, Holland, and other states. Empire trade was still reserved for the mother country through a system of preferential duties levied in the colonies in favor of the British trader. Certain changes had been made in the mercantilist system during the 1820's, but down until the early 1840's Great Britain was endeavoring to supply all her own food needs and sell a great surplus of manufactured goods to foreign nations.

The other countries of Europe and the United States likewise had high tariffs, or adopted them, to encourage the development of their own industries. The tariffs were regarded by English manufacturing interests as a direct retaliation against the British Corn Laws. The manufacturers reasoned that the only way in which foreign nations could pay for British manufactured goods was by selling grain to Great Britain, and since the English refused to take foreign grain, the nations which had it for sale, Russia, Prussia, France, and the United States, were left with no recourse but to shut down on British manufactured goods and encourage home industry. It was felt, moreover, that the protection of English agriculture by the Corn Laws resulted in higher food prices in England, that these in turn brought about higher wages and higher manufacturing costs, and thus lessened the ability of British goods to compete in foreign markets.

These views were widely held in England during the 1820's and were responsible for the interest of the British manufacturing classes in political reform in the period 1830-1832. They believed that if they could get the franchise extended, they would have enough parliamentary influence to repeal the Corn Laws. This notion proved incorrect; for the Reformed Parliament was as much under the influence of the agrarian interests as its predecessors, and neither political party, the Whigs or the Tories, had any interest in touching the Corn Laws.

With the depression of the late 'thirties and early 'forties another point became important. This was the recognition of the fact that in British agriculture the law of diminishing returns was setting in, that more intensive cultivation was not yielding a proportional increase in the supply of food. The pressure of population was going beyond possible additions to the yields from British farms. Great Britain could no longer be self-sufficient in the matter of food. Consequently, whatever justification there had been for bolstering up agriculture by a high protective tariff, on

the ground that through the tariff British agriculture kept the nation independent of the outside world in the matter of food, was now gone. The tax on food was clearly now nothing but a burden on industry and on labor in behalf of the landowning classes without even the possibility of a plea of national utility.

As the depression of the later 1830's intensified, Chartist democracy offered one way out of the economic and social maladjustments of an intensified industrialization; socialism offered another. Still a third, much more painless, was found in the abandonment of mercantilism and the universal extension of free trade. English manufacturers organized themselves into the Anti-Corn Law League to attack mercantilism in its inmost citadel by educating the public to the significance of agricultural protection and by putting pressure on Parliament to abandon the policy. By 1844 the League had £90,000 in contributions from manufacturers. It employed 800 speakers, organizers, and others, printed and distributed 9,000,000 tracts in which the economics of the Corn Laws were explained simply and clearly, and held nightly meetings throughout the country to bring home to the farmer, factory worker, and agricultural laborer the meaning of the Corn Laws in pounds, shillings, and pence. The greatest figures in the movement were Richard Cobden and John Bright, whose attacks on the foul monstrous evil of the tax on bread left even Sir Robert Peel, the prime minister, unable to reply.

Although the Anti-Corn Law League succeeded in stirring public opinion to the very depths, neither the Whig nor the Tory party was willing to sponsor a bill to repeal the Corn Laws. The issue was forced, curiously enough, by the fiscal requirements of the British government. The budgets of the late 1830's and early 1840's showed deficits, with almost no yield at all from the tax on grain. The chancellor of the Exchequer proposed, in 1841, to amend the Corn Law of 1828 by substituting a fixed duty for the sliding scale, in the hope of adding to the government's receipts. The cabinet was at once defeated in the House of Commons, ostensibly on another issue. In the general election which followed the Tories raised the cry that the whole issue of protection was at stake and carried the country. Sir Robert Peel became prime minister at the head of a Tory cabinet, with a mandate to keep the Corn Laws and the protective system. Peel was convinced, however, that lower general rates on manufac-

tured goods would bring in that increase in revenue which the Exchequer needed. In the budget of 1842 the general rates of duties, fixed between 10 and 30 per cent in 1825, were reduced to levels ranging from 5 to 20 per cent. So great were increases in the revenue that Peel made further reductions in 1843, 1845, and 1846. Raw materials as a result came into England free and manufactured goods paid a maximum duty of 10 per cent. Export duties, generally speaking, were abolished in 1845. Although Peel was still adamant on the subject of the grain duties, in 1843 he abolished the duty on the import of wool. Wool was as much an agricultural product as was grain; if the landowners whose land produced wool had no right to protection, on what principle could it be claimed by the landowner whose land produced wheat? The logical reply was, "None," and Peel's party began to ask whether he would lead them.

The fact is that Peel was paying a great deal of attention to the campaign of the Anti-Corn Law League, and was gradually coming, with the help of investigations on his own part, to realize that England could no longer hope to be self-sufficient in the matter of food. He began to realize that the high prices of food fostered by the grain duty were a heavy burden on the working classes and a serious impediment to industrial advance, on which the nation must rely in the future for its greatness. His decision to take some action was precipitated by the potato famine in Ireland in 1845. In October of that year he began to debate free trade in the cabinet, but finding his ministers hostile to the idea, in December he resigned as prime minister. Just two weeks before his resignation Lord John Russell, leader of the Whigs, had tried to commit his party to the cause of corn law repeal. So little ready were the Whigs to adopt the policy of repeal that Russell refused to accept office when Peel resigned, for fear that he should have to introduce a repeal bill which would split his party. He preferred to let Peel do any party-splitting that was necessary among the Tories.

When Peel resumed office he first suspended the Corn Laws to allow the free importation of food to feed the starving Irish and then followed this measure with another, to repeal the Corn Laws completely after February 1, 1849. With the help of the public opinion in its favor, created by the Anti-Corn Law League and the Irish famine, the measure passed the Commons, though

it is said that not a hundred of the politicians there present really wanted it. In the House of Lords its passage followed the Duke of Wellington's advice to the peers not to reject the bill in the face of the temper of the country and the popular clamor in favor of it.

Even with the repeal of the Corn Laws, England was not completely liberated from the mercantilist system. Besides preferential treatment for British trade in the colonies, the Navigation Acts and certain duties on manufactured goods still remained. In 1849 the Navigation Acts were repealed. In 1853 certain reductions were made in the remaining duties on manufactured goods. Seven years later, in 1860, all remaining duties of a protective nature were removed. There remained only a few duties on articles such as tea, sugar, spirits, and silver plate, which were levied either for purposes of revenue or to equalize the internal excise.

The removal of the last vestiges of protective duties by Great Britain in 1860 came largely as the result of the work of Richard Cobden. After the repeal of the Corn Laws he set out to convert the world to free trade. He was genuinely convinced that wars would cease if all nations throughout the world were united into a single economic entity through the beneficent action of free trade. He assumed that each geographical area would gravitate toward producing the commodities for which it was best fitted, and through the free exchange of these commodities, produced under the most favorable conditions and at the lowest prices, all would benefit. There would be a sort of international division of labor in which interference of interests would be replaced by cooperation toward the common end of human happiness. England would manufacture the cotton and iron staple wares, France would supply fine goods and wines, Prussia, Russia, and the United States would grow grain to feed Great Britain. Unfortunately, such is the perversity of the human kind that people generally had no wish to be set on doing what they could do best. They sooner or later discovered that they could not be happy, secure, or safe until they had a full-fledged industrial system in operation.

There was, however, one quarter in which Richard Cobden found an appreciative hearer. Napoleon III was, in the late 1850's, rather isolated, and he wanted to renew the closer rela-

tions with England which had prevailed during the Crimean War. A trade treaty between Great Britain and France seemed to offer possibilities toward this end. Cobden was accredited as Great Britain's plenipotentiary; Napoleon III personally represented France. In his eagerness to get something which might lead to a better political understanding with England Napoleon III disregarded the fact that the bulk of the manufacturing interests in France wanted protection. It was agreed that in return for the abandonment of protective duties on imports from all countries into Great Britain, France would reduce her duties to a maximum of 30 per cent, and later, of 24 per cent. The treaty was general in form and contained a most favored nation clause, so that if France negotiated an identical treaty with any other nation, Great Britain would receive the same trade benefits received by France. It was in accordance with the terms of the Cobden treaty that, in 1860, Gladstone removed duties on 371 articles and reduced the duties on French wines. Only 48 articles remained subject to duties, and in these cases, as already indicated, the duties were for purposes of revenue and not for protection.

The British example of the complete abandonment of mercantilism was infectious. Russia reduced her tariffs in 1844, 1856, and 1857, Switzerland in 1849, Piedmont (Italy) in 1855-1861, Sweden and Norway in 1857, Denmark in 1863, Belgium in 1861 and in 1865, and Holland in 1865. Even in the United States, the very ark of the covenant of protection, there was a tendency during the late 1850's toward lower tariffs. This trend was, however, checked by the opening of the Civil War and the necessity of raising more revenues. The American tariff of 1862 was again keyed on a higher scale of schedules, and the United States did not join the rest of the world in the general lowering of duties.

There was one very significant implication in the abandonment of tariff systems by governments generally which is most clearly illustrated in England. In 1842, in order to provide revenue during the period of readjustment following the new duties of that year, Peel introduced, as a temporary measure, the income tax. It has never been given up. The duty of supporting the state was thus shifted to a certain extent from the shoulders of the mercantile and consuming classes to those of the receivers of incomes in the higher brackets. These were far less numerous than the masses of the consumers and could be milked by the state in the

future with much greater ease. An extra penny or an extra 5 per cent on the income tax was far more profitable and far less disturbing politically than an alteration in the tariff. This is one of the most fateful discoveries in politics in the modern world.

The Reactions of the Abandonment of Mercantilism upon Imperialism

The repeal of the British protective tariff schedules and of the Navigation Acts had important reactions upon the relations of Great Britain with her colonies. With the alterations in the Navigation Acts which were made in 1822 Great Britain abandoned the attempt to monopolize the trade in the raw materials of the colonies and to provide all manufactured goods for them. Yet there was a feeling that the British trader in the colonies ought to be given certain advantages over the foreigner. This was done by a preferential system of duties in the colonies, with higher rates applicable to foreign than to British imports, and by the extension of preferential treatment in British ports to imports from the colonies, such as sugar, timber, and wheat. Peel thought that this preferential system ought to be extended, so that in every case conditions would favor the development of trade between the colonies and Great Britain rather than between the colonies and foreign countries. Peel stated his position in this way, "If you look properly at the relations between yourselves and the colonies you must consider your colonies entitled to be put on a different footing from foreign countries and that it is perfectly fair to give to articles of colonial production a preference in your markets over the produce of foreign countries. I am disposed to think even that you ought to carry the principle of assimilation, if you can, so far as to consider the colonies as an integral part of the empire for all commercial purposes."

Yet Peel himself carried through the repeal of the Corn Laws, which made it impossible any longer to give any preferences to colonial wheat, since after February, 1849, all wheat entered British ports without duty except for a small registration fee. He also reduced the preferences given to timber and sugar from the British colonies. The repeal of virtually all duties in 1853 and 1860 made colonial preferences utterly impossible. The mercantilistic imperialists were furious and asserted that there were

other considerations than the price of a pound of sugar which should be kept in mind. If Parliament were turned into a counting-house, it would not be long before the nation degenerated into a factory.

When preferences to colonial goods in British markets were abolished it seemed only fair that preferences to British goods in colonial ports should likewise be removed. A statute was accordingly adopted, permitting the queen-in-council to assent to the reduction of duties on foreign goods in the colonies to the levels paid by British imports. The next step was to give the colonies the right to impose any duties they liked, provided they were not differential. In 1873 the colonies were allowed complete freedom in tariff regulations.

The lessening of the value of the colonies arising out of the mere fact of sovereignty was accompanied by a growing belief in influential quarters in Great Britain that it might be well to give the colonies their independence. Richard Cobden expected to see free trade end the colonial system, with all its dazzling appeals to the passions of people, by gradually and imperceptibly loosening the bonds which united the colonies to Great Britain by a mistaken notion of self-interest. John Bright would have been glad to see the colonies go. In the decade from 1860 to 1870 many leading politicians, including Gladstone and ministers of his cabinet, publicly expressed themselves as willing to see the colonies declare their independence when they were ready for it. Mercantilistic imperialism seemed so nearly dead that one authority suggested that Great Britain might give twelve months' notice to a colony that it was independent.

Yet at the same time that mercantilist reasons for keeping the colonies seemed to lose their force, there continued to be a tremendous emigration from Great Britain to Canada, Australia, and New Zealand. While the numbers of the later 1850's and 1860's were not so high as at the peak between 1847 and 1854, and while the majority of those who left the British Isles went to the United States, between 1850 and 1870 over a quarter of a million persons went from Great Britain to Canada and nearly three-quarters of a million went to Australia and New Zealand. These emigrants took with them British ideas of self-government; and since the home government was disinclined to exercise any

great measure of control, rather complete colonial autonomy developed. This reached an important stage in the British North America Act of 1867, which established the Dominion of Canada.

Economic Progress Attending the Abandonment of Mercantilism

It is not suggested here that the introduction of freer trade between the great industrial, agricultural, and trading nations of the world, which characterized the generation from 1850 to 1870, was solely responsible for the economic progress of the period. It was but one factor in the stimulation of world commerce. The very adoption of freer trade was rather a symbol of a worldwide eagerness to let nothing stand in the way of the fullest utilization of the new transportation systems on land and sea, to do away with clumsy old rules which prevented people from buying as cheaply as they could and from selling in the best market. Free trade was the practical application to commerce of the doctrines of laissez-faire. Its adoption represented in England the seizure of political control by the lords of the loom and the chimney barons, the manufacturers of the north and west, with whom free trade became virtually a religion, the true way of life. In the freest development of foreign commerce they saw the hope of settling England's social problems and above all of increasing their own wealth.

Transportation and Communication, 1850-1870

The expansion of international commerce in the period from 1850 to 1870 is illustrated by figures for the clearances from British ports. In 1844 the tonnage of ships entered and cleared from British ports in international trade was 10,300,000 tons. In 1860 it was 24,700,000, and in 1870, 36,600,000 tons. Among the mechanical factors in this development, in which free trade was partly cause and partly symbol, the first is the continuing spread of the railroad network, followed by increased shipping tonnage, and the laying of electric submarine telegraph cables. The railroads fed the ports, the ships carried goods to and from the ends of the earth, and the cable by bringing buyers and sellers into

instant communication contracted the world into a single market with a more or less identical price level.

The railroad construction of the period ending in 1850 had been merely the preliminary to the vastly greater activity of the generation after 1850. Great Britain had about 6000 miles of railway line in operation in 1850. In 1870 she had 15,540 miles of line open.

On the oceans the major portion of the world's ships in 1870 were sailing vessels still. Yet the largest part of the new construction during the past ten years had been steamships. Following the great age of the clippers in the late 1840's and early 1850's came that of experiment in ocean-going steamships. Iron was adopted for their hulls and the new screw propeller for the driving mechanism. Sixty per cent of the world's tonnage in 1860 was British; more than 30 per cent was American (not including in this figure coast, river, and lake ships). But the depredations of the British-built Confederate commerce destroyers during the Civil War destroyed a number of American ships. Moreover, after the war, with the trend definitely toward iron ships, the Americans found much greater returns in building railroads than in building iron steamers. So America fell behind, and in 1870 there was no real second to British primacy in the shipping world.

Improvement in ship design culminated in the planning by Isambard K. Brunel and the building, between 1852 and 1858, of the steamship *Great Eastern*, the greatest mechanical achievement of the middle of the nineteenth century. This vessel, which was not surpassed in size until 1901, was large enough to carry her own coal for a voyage out to India and back, together with 4400 passengers and crew. She was 680 feet long between perpendiculars, 83 feet beam and 118 feet over her paddle boxes, and 70 feet to the top of her bulwarks. Propelled by both paddle wheels and a screw propeller, with ten boilers and eight engines, she rated a gross tonnage of 18,915 tons. A vessel of this size was of course premature, since in 1870 not more than 6 per cent of all vessels were over 2000 tons. She lost money for her owners from the time when her launching was first attempted until she was broken up for scrap. But she embodied the new lines of design which were to be followed in steamer construction and holds therefore a great place in maritime history.

A sharp impetus to new steamer construction was given by the opening of the Suez Canal in 1869. The Gulf of Suez and the Red Sea were not easily navigated by sailing ships. All shipowners who desired to participate in the economy in distance afforded by the canal were compelled to adopt steamers.

On June 23, 1870, the Viceroy of India sent a telegraph message from Simla to the President of the United States in Washington by way of an evening party in London. This event marked the completion of the last link in the direct English cable from London to Bombay, the culmination of five years of intense activity of submarine cable laying all over the world.

The early 1850's had seen a number of short submarine cables, such as the Dublin-Holyhead, the Dover-Calais, and the Genoa-Corsica lines. The later years of this decade saw the beginning of experiment and disappointment with deep sea cables. Cyrus Field and his Atlantic Telegraph Company laid a cable that snapped, another that worked feebly from August 5 to September 1, 1858, and then was silent. The Indian mutiny of 1857 determined the British government to link England and India; the Red Sea and Indian Telegraph Company, with the help of a generous subsidy, completed its cable lines from Alexandria to Karachi on March 14, 1860. It worked for a short time and became derelict. The Dutch tried their luck with a line from Singapore to Batavia, and that too failed. By 1861, 11,364 miles of submarine cable had been laid; only 3000 miles, generally along shore or across short channels, were working.

During the American Civil War interest in cable laying lagged, but as soon as the war was over the cable ships were out again. The Great Eastern was chartered to lay a cable by a new company organized by Field. The cable laid in 1865 snapped. A second was successfully laid in 1866, and the broken cable of 1865 was recovered, repaired, and completed. Extensive cable laying in all the seas of the earth was at once undertaken, and land lines were extended to remotest districts. During the late 1860's, a Danish company, the Northern Telegraph Company, carried a great land telegraph line from Moscow to Vladivostock, and shortly after the completion of the London-Bombay line in 1870 the Northern Company laid sea lines from Vladivostock to China and Japan. Here they were met by the cables of the Eastern Extension Company, which stretched from India around southern

Asia to Singapore and thence to Australia and New Zealand. In 1874 South America was put into direct communication with Europe by the Brazilian Company. By 1875 the major portion of the work was done, although the trans-Pacific lines were still to be laid. It was not yet possible to telegraph to the interior of China, to Hawaii, Iceland, New Guinea, or Tierra del Fuego. Everywhere else one was in immediate touch with the rest of the world through the magic of the telegrapher's key.

Mail service was greatly improved also. In 1839 Rowland Hill introduced the uniform penny postage for the United Kingdom. In 1875 the International Postal Union was formed to extend cheap efficient postal service to the carriage of letters between all countries of the world.

Industrial Progress

It is not necessary to enter into a detailed story of the industrial progress of the generation between 1850 to 1870. It was an era of the invention of ingenious machinery, such as the reaper, the sewing machine, and the refrigerating machine. The reaper increased the amount of food which could be grown in the far parts of the world. The extent of the land that could be cultivated in America or in other colonial areas was no longer limited by the number of those who could swing a scythe. The refrigerating machine made possible the preservation of meats and perishable foods for long periods. In the 1880's their shipment from Australia and New Zealand to England began. The sewing machine provided cheaper and more abundant clothing and shoes. Of greater importance than any single machine were the new ways of making steel, which made that material for the first time available in unlimited amounts at low cost. As a result of these new processes steel was to become the most characteristic material of modern civilization.

New Processes of Making Steel

From the technological point of view much of the progress of the generation from 1850 to 1870 and of the time which followed was closely associated with the availability of a material both strong enough and cheap enough for the construction of the

heavier, more rapidly moving machinery of the day. Before the end of the first half of the nineteenth century the material generally used for mechanical purposes was puddled iron. It was used for rails, for railroad axles, for the working parts of steam engines, for boilers, for cannons, and even for the frames and hulls of ships. Steel, as already noted, was extremely costly, but there was much interest in it. In Germany the Krupps manufactured a very high grade of cast steel, which was shown at the London Exhibition of 1851, and several English manufacturers were engaged in manufacturing steel.

The inadequacy of the strength of puddled iron for the heavier duties to which it was being subjected was brought out into clear relief by some experiments made by Sir Henry Bessemer during the Crimean War. He invented a new type of cannon with a rifled barrel for use against the Russians at Sebastopol. Ladies at evening parties were provided with a vicarious thrill when they were permitted by Bessemer to blow a projectile across the room from a miniature of the new gun. When Bessemer constructed a working model of his invention, he found that the tensile strength of iron was not great enough to take a full charge of powder. There was but one thing to do; and that was to find a way of producing steel in sufficient quantities to use it in manufacturing ordnance.

Bessemer, already something of a success as an inventor, applied himself to the problem. It must be kept in mind that iron, as it comes from the smelting furnace, contains from $2\frac{1}{2}$ to 4 per cent of carbon. This excess makes the material, known as pig or cast iron, brittle. When all the carbon is removed, the material is malleable or puddled iron. Steel contains a small amount, from $\frac{1}{2}$ to $1\frac{1}{2}$ per cent of carbon. The problem was to add the carbon to pure malleable iron or to take away enough carbon from cast iron to form steel. On August 11, 1856, Bessemer read before the British Association at Cheltenham his paper on "The Manufacture of Iron without Fuel." The fuel to which he referred in the title was that previously used in puddling or in the making of crucible cast steel. His plan was to run the iron directly from the smelting furnace into a converter, where a powerful blast of cold air driven through the molten mass from below would burn out the impurities, particularly silicon and carbon. The blast could be regulated to burn out all the carbon if malleable or

puddled iron was wanted, or only a portion thereof if steel was the desired product.

In actual practice Bessemer found it difficult to regulate the amount of air so that exactly the right amount of carbon remained in the iron to form steel. The rapid combustion of the silicon and carbon in the presence of the intense blast generated enough heat to keep the mass completely molten until all of the carbon was consumed. It was therefore easier to add to the molten mass quantities of iron which contained known quantities of carbon and of manganese, another element which had long been known to lend strength to steel. Bessemer also found it necessary, in order to stop and start the blast at will, without clogging his air pipes, to be able to swing his converters so that the air pipes could be swung clear of the mass.

Bessemer at once took out patents on his new process all over the world and sold licenses to use it to ironmasters everywhere. He himself built a converter at Sheffield to produce tool steel. Since Bessemer and his partner used iron smelted far from Sheffield, the pigs had to be remelted, and steel was not made "without fuel." Yet it was made cheaply enough, at from one-half to one-fifth its former price. Neither did the partners sell much of their product for tool steel, but rather for cranks for locomotives, axles, propeller shafts for ships, and tires for railway wheels. During the fourteen years of the partnership Bessemer's own firm made profits at a rate which he conjectured had never been equaled in the history of commerce. Including the selling price of the business at the end, but excluding all sales of licenses, the profit on the original capital throughout the fourteen years averaged "nearly cent per cent every two months." Six hundred per cent a year for fourteen years! Such were the rewards which were heaped on the man who made steel a possible material in the modern world.

Even before Bessemer worked out his process, William Kelly, an ironmaster in Kentucky, troubled by the shortage of charcoal fuel for puddling purposes, discovered that a blast of air driven over the molten smelted iron raised its temperature and refined it. His efforts to build a successful converter were, however, long unsuccessful. He was able, nevertheless, to prove to the American patent office that his discovery was prior to Bessemer's, and he was

given priority rights over Bessemer's American patent. Eventually the companies working the Kelly process and the Bessemer process were amalgamated, and Kelly's name in connection with the new steel was forgotten. In Germany the Bessemer license was purchased by the Krupps, who, established in 1810, were already famous for the quality of their cast steel and for their enterprise in developing its use.

Bessemer's converter process was not the only one with which he experimented. In October, 1855, he took out a patent for another method of producing steel by "the fusion of steel in a bath of cast iron," but in view of his interest in the converter process he did not follow up his experiments. Bessemer's patent of 1855 covered the essential feature of what is now known as the Siemens-Martin open hearth process, patented by Emile and Pierre Martin of Sireuil in 1865.

Siemens was a scientist interested in economy in engines, and from that field he passed to the investigation of economy in furnaces. After many years of research he perfected the regenerative gas furnace. In this a current of incoming gas, which may be of many kinds and always cheap, heats the fire-brick labyrinth of the regenerative chambers. Succeeding volumes of gas are sucked in along with air to burn at far higher temperatures. By regulating the volume of the gas and air the temperature of the furnace can be exactly controlled. The regenerative furnace may be used in any industry where very high temperatures are required; indeed, the first regenerative furnace was used in a glass works. Siemens himself believed that it could be advantageously used in the making of steel. In 1865 the Martins of Sireuil succeeded in making steel by melting scrap steel in a bath of molten pig iron on an open Siemens hearth and took out their patent. Siemens modified the Martin process somewhat in a plant which he and some partners built in 1869 in Wales. Into a bath of molten pig iron he fed, at full heat, a pure ore in small quantities. During the combustion which followed carbon escaped as carbonic oxide and the silicon formed a slag. The perfect control of the furnace temperatures made it possible to control the quality of the steel much more exactly than could be done in a Bessemer converter. The Siemens-Martin process made headway, at first slowly, but later more rapidly. When Bessemer died in 1898, more open hearth

or Siemens-Martin steel was being made than Bessemer steel. During the two generations since this date the Bessemer converter has yielded more and more to the open hearth process and in some countries has gone completely out of use.

The Bessemer process was soon discovered to be unsuited for use with ores which contained phosphorus. Since the major iron ore deposits of the world do contain small amounts of this element, there was an early interest in the invention of a process by which this phosphorus-bearing ore too could be utilized for the making of steel. Success finally attended the efforts of Sidney Gilchrist Thomas, a young clerk in a Thames Police Court with a classical education, and his cousin, Percy Gilchrist, an iron-works chemist. Experimenting with a model Bessemer converter, they found that the difficulty lay in the refusal of the silicon in the fire-brick lining of the converter to combine chemically with the phosphorus of the ore. They substituted bricks of powdered limestone for the silicon bricks in the converter lining; they persuaded the manager of the Bolckow-Vaughan works to put his resources at their disposal and in 1879 the thing succeeded.

The announcement of their success was an international event. "Middlesborough [where the Bolckow-Vaughan works were situated] was soon besieged by the combined forces of Belgium, France, Prussia, Austria, and America." Basic steel gave real value to the iron ore fields of Lorraine, taken by the Germans from France eight years before. The world outside of England generally, with a limited access to Bessemer ore but endowed with great reserves of phosphorus-bearing iron, was able to enter into the business of manufacturing steel on an unlimited scale.

The transition from puddled iron to steel, which occupied the whole period from 1850 to 1870 and extended well into the next generation, had an important reaction on Great Britain's position as the leading industrial nation of the world. This place she held down to and somewhat after 1870. The coming of steel broke England's lead. Because England was well supplied with puddling furnaces, there was a kind of hesitancy in going in the largest way into the business of making steel. The Germans and the Americans, therefore, not only started even with Great Britain, but going at a faster pace very soon outstripped her. By 1886 the United States surpassed Great Britain in the output of iron and steel, and in 1901 Germany likewise passed her.

Improvements in Mechanical Techniques

Of great significance in the new age of steel were the improved techniques for manufacturing metal into engines, machines, and structures (such as ships) which were perfected in England by Whitworth and Armstrong. Whitworth was the great exponent of precision in manufacture. He worked out the true plane as a standard for reference, a scheme of standardized screws, screw threads, and essential parts, a system of patented machine tools, and the use of gauges adjusted to the ten-thousandth part of an inch. The new practice of working to very accurate limits spread rapidly during the 'fifties and 'sixties, and in such things as textile machinery parts became perfectly interchangeable. In 1854, at the time of the Crimean War, Whitworth was invited to build rifle-making machinery for the government. To do this he felt that he first would have to decide on what kind of rifle was the best, and as a result of his researches brought out the Whitworth rifle. He then turned to guns, and some of those made by him were supplied to the Confederate side during the American Civil War. In 1868 a Whitworth gun was built which could throw a 250 shot six and one-half miles. Whitworth was not satisfied with the quality of steel available. He believed that maximum strength and ductility could be provided by compressing steel, while it was still fluid, by the hydraulic presses which were available as a result of Armstrong's interest in hydraulic machinery of every kind.

Compressed steel possessed a very close-knit structure, so that it presented more perfect bearing surfaces than had ever been attained previously. Used in hollow propeller shafts on ocean liners during the 1870's, in engine parts, in railway underbodies, and in machine bearings, it was to play an important part in the speeding-up process so characteristic of industry of the later part of the nineteenth century. With the new steel it was possible to make machines to run at speeds which would have racked to pieces within a short time machines made of puddled or cast iron.

It is rather interesting to note the part taken in the advances in metallurgy by the requirements of national armaments in the period under discussion in this chapter. Bessemer steel and Whitworth compressed steel were the direct outcome of armament requirements.

The Era of Rising Prices

Free trade and steel are so significant for the period from 1850 to 1870 that they may almost be taken as the symbols of the era. A third factor which was exceedingly important in shaping the destinies of the age was a general rise in the price level. The fall in prices which had begun in 1821 was reversed just after the middle of the century. In 1852 a rise in prices set in, which continued until 1873. During these years prices in general rose about 37 per cent, and in 1873 they were about 25 per cent higher than they were in 1790.

At first sight the new gold from California and Australia is sufficient to account for this increase in prices, and indeed the increase in gold supply of the world after 1849 was of much importance. Yet in comparison with the actual total sums used in business in the course of a year, the new gold, even though turned over many times, was very slight in amount. Perhaps more significance should be attached to the increased use of checks, which became very important in this period in large commercial transactions. The expansion of bank credits, which was not accompanied by immediate increases in production, must also be considered. In important instances increased production went into armaments or was destroyed in wars and was not available for normal use. Of these wars there were three of major importance in the period, the Crimean War, the American Civil War, and the Franco-Prussian War. Beside these there were a number of lesser conflicts, such as the campaigns for the liberation of Italy, the Austro-Prussian War, and the war between the European powers and China in 1856-1858. These struggles aided the upward tendency of prices in so far as the increased bank credits to which they gave rise were not compensated by additional supplies available for everyday use.

The problem of price changes must be considered from more than the monetary angle. The factors of production and consumption and of capital investment are involved as well as currency. The rise in production during this generation was accompanied by a great deal of railroad building, the laying down of new ship tonnage, the building of new steel mills, and the construction and enlargement of factories. All such work involved large

capital investments from which in some cases there was only a small immediate return. With excessive activity in investment there were less goods immediately available for human consumption. This situation expressed itself in price changes. Indeed, in the case of materials which went most directly into new capital construction such as iron, the price increase was almost four times the average rise.

There is one other element in the development of the period which probably contributed to the upward movement of prices. This was the opening up of more extensive trade between the various parts of the earth by means of the telegraph, the railroad, the sailing ship, and the steamer, aided by the relaxation of high tariff rates. As the world tended to become one market, the wider distribution of goods and the larger numbers of potential consumers sent prices upward.

The causes of the price rise are complex enough. The effects of the process, however, were very direct. Rising prices stimulated business activity. The burden of the interest charges on war debts and on the capital costs of new industrial enterprises grew smaller from year to year, as long as the upward movement continued. Real wages fell where money wages remained the same, but the employment situation in a rapidly expanding market was in general so favorable to the workers in western Europe, America, and Great Britain that they were able to justify and to force increases in money wages of an important kind. It is estimated that in England the average wages of all wage earners rose by 48 per cent from 1850 to 1873. Miners' wages rose by 60 or 70 per cent; builders, by 50 per cent; the wages of a man who did not change his job from 1850 to 1873 probably averaged a 40 per cent increase. The growth of economic power in the hands of the masses provided by this increase in wages showed itself clearly in the further extension of political rights which took place in Great Britain in 1867.

The Growth of the Factory

It is a truism that there is a close correlation between the expansion of the market area and the use of machinery and the factory as a unit of production. As the scope of commercial operations was widened by the development in transportation and as

machinery became more complex and expensive, the factory made rapid strides. From the textile and metal trades factories spread to other industries as these were transformed by machinery and steam power to supply a world market. Machines, constantly improved by new inventions, were run at steadily higher speeds. Factories became larger. By 1870 in Great Britain 999,000 horsepower, nearly all generated by steam engines, were used in the factories as compared with perhaps 150,000 horsepower in 1850. There were 2,417,000 workers in 127,000 separate "works" of such character that they came under the scope of the factory acts. The largest units were the shipyards building iron steamships; in this industry 78 firms employed an average of 570.5 workingmen each. Among these were 30 Scottish yards, employing an average of 800 workpeople each. Next in size came the iron-making works, such as blast furnaces, puddling-furnaces, and rolling mills, which averaged 209 men each. Twenty-six of the largest establishments in this category averaged 650 employees. Of course there were great contrasts. In all the metal-working industries the average number of workers per establishment was 34.5. This figure indicates that alongside the great blast furnaces there were little country machine shops with only a few workers each.

In the textile trades the factory was growing in size, but was not always significantly larger than in 1850. There were, in 1870, 2469 cotton factories employing 436,000 people, with an average of 177 workers. While the cotton, worsted, and flax and jute trades were thoroughly mechanized by 1870, there was still a good deal of old-fashioned hand work in woolens, silks, and hosiery. In the hosiery trades the factory was just getting under way. In the boot and shoe trades there were factories in 1850, but they had neither machinery nor power. Although boots were made by machines during the Crimean War, with the coming of peace machinery was forgotten. In 1871 there were in England only 400 horsepower of steam in 145 boot and shoe factories, and in the clothing trades not much more. In spite of the growing mechanization of industry and the tendency toward large-scale production everywhere, many shops were very small, there was much domestic work in many trades, and some industries, like cabinet-making and blacksmithing, scarcely felt as yet the effects of progress.

The changes in the size of industrial units were accompanied by

significant alterations in the form and nature of ownership thereof. Individual and family proprietorship continued, of course. Partnerships, as in the past, were common. To tempt investors to provide additional capital there was everywhere a tendency to limit the liability of persons who put their money into a business but did not take an active part in its management. Yet even such provisions did not assure the mobilization of capital in amounts adequate to meet the needs of industrial development. Although as late as 1854 a royal commission in England looked with scorn upon the investor with one or two hundred pounds (\$500 to \$1,000), the industrial entrepreneur soon came to realize that hundreds of investors, each with a comparatively small sum to put into a business, could provide much more capital than a very few men with even very large amounts of money at their disposal.

The device by which smaller capital sums were attracted to industrial investments was the use of the joint stock company form as a general type of industrial set-up. Joint stock companies were already much used for public utility undertakings and for banking and insurance companies. In England a general revision of the company laws in 1855 and 1862 permitted the easy formation of joint stock companies with limited liability, to draw the small investor and his capital into participation in industrial enterprises.

The Progress of Science

Ever before the eyes of mankind in its difficult struggle up from the slime has been the distant vision of the delectable mountains. The way toward the goal has taken many devious turns, has been called by many names. During the middle nineteenth century there was a particularly good stretch, when men everywhere felt that they were actually getting nearer their hearts' desire. The ease and comfort of the road, the progress and advance were real. Human perfection, thanks to man's increasing control over the forces of nature, seemed just around the corner. The abundance of material possessions which led men to think that they were making rapid strides toward the goal was the outcome of knowledge organized and applied to the problems of production.

It is by some such line of reasoning that men were led to a new regard for science and to its exaltation as the key to all prob-

lems. There developed in consequence during the nineteenth century a zeal without precedent for the investigation of natural phenomena and for the accumulation and organization of facts regarding them. The success of the machine and applied science in industry strengthened the impulse to investigation.

The broad tendency in scientific advancement during the nineteenth century was the extension of the experimental and mathematical methods of dynamics to the other subdivisions of physics and to chemistry and biology. Physics and chemistry proceeded to develop along the lines marked out by Newton and Lavoisier. So concordant was the growing structure that it was assumed that no striking innovations were likely, that the research to be done consisted chiefly of the accumulation of data, refinement of observation, and the perfection of measurement. Brilliant work was done in showing the equivalence between heat and work; in elaborating the atomic theory to account for chemical reactions; in determining the properties of electrical currents; in establishing the wave theory of light; in the discovery of electromagnetic induction, the basic element in nearly all later electrical machinery such as motors and dynamos; in developing the concept of energy as "the power of doing work," and of its conservation throughout an isolated system; in enunciating the laws of thermodynamics and the recognition of the tendency of all bodies to assume a condition of entropy; in the invention of the spectroscope and the discovery through spectrum analysis that the heavenly bodies contained the same elements as the earth; and in the study of the behavior of electric waves. In the practical applications of physical and chemical knowledge important advances were made, from the study of fertilizers to the chemistry of steel; from the electric telegraph to the high temperatures of the regenerative furnace. Of vast importance to the physical sciences was the new mathematics developed during the century. To the older departments of mathematics as known in the past were added the theory of numbers, theories of forms and groups, and the general theory of functions. A non-Euclidean geometry made it possible to discuss the properties of non-Euclidean space, irrespective of whether such space was known to the senses.

The physical and chemical sciences were the foundations for the vast industrial superstructures erected thereon during the nineteenth century, and ought therefore to be mentioned in a study of

economic development. Geology and the biological sciences, with their contributions to the evolutionary thesis, did much also to widen man's mental horizon and to revolutionize his ways of life and thought.

Economic Progress and Cultural Life, 1850-1870

The production of material goods is but one side of the richer life made possible throughout European civilization by the industrial and commercial progress of the middle of the nineteenth century. Still another aspect of the new world of that day is to be seen in the cultivation of the arts, which lent grace and refinement to life and provided a noble use for the new leisure of large numbers of the middle classes through participation in artistic activities. Culture became middle-class, since the middle classes now had both the time and the money to concern themselves with it. Aristocratic tendencies in art persisted strongly, since the middle classes everywhere consciously aped the patterns of the conduct and manners of the nobility; but the instinctive and traditional view of life held by the middle classes, their own problems, situations, wants, and ideals supplied the subject matter, the setting, the mode of treatment, and the audience for much that was really significant in the artistic achievements of the time.

The middle classes, moreover, were everywhere moved by a great ethical purpose. Life was real, and life was earnest, and the grave was not its goal. Art must therefore be more than a pleasant way of relieving ennui. It must contribute to the attainment of some good end; teach a lesson, advance a cause, carry a message, clarify the vision, ennoble and lift up our common humanity, and even be in itself a service of worship of the Divine. Imagine the aristocratic art of the eighteenth century bound by any such injunctions!

While individuals in all nations engaged in all of the various forms of artistic expression, some national groups excelled in one field, others in another. The English were supremely great in literature, but at the same time they produced painters of merit and built some buildings of interest.

Bessemer steel and evolution, steamships and Darwin, Dickens and railroads, free trade and Tennyson, steam-powered factories and Ruskin, the pre-Raphaelite School and the end of slavery!

What a generation! The apotheosis of the middle class and its ideals! The economic and the scientific life of this generation from 1850 to 1870 was closely connected with the aspirations of the middle classes as expressed in terms of liberalism (strictly limited) and of nationalism, limited and unlimited, as suited their needs.

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VOLUME PRODUCTION AND SOCIAL LIFE, 1870-1900

DURING the first half of the nineteenth century the factory had made considerable strides, but the units of production everywhere were still on a comparatively small scale as late as 1850.

The acceleration of production toward its later nineteenth-century levels began perhaps in the 1840's; but it was not until the 1860's and early 'seventies that things went with a rush and continued with a whirl. Some notion of the rate at which larger plants were established may be gleaned from the figures for joint stock company flotations, which proceeded on an extensive scale in all countries. In England, for example, in 1852, 165 companies were registered, in 1860, 790, and in 1864, 997. The average number from 1865 to 1869 was 642, with an average capitalization of £98,297; from 1880 to 1884, 1564, with an average capitalization of £188,019.

While the textiles continued their earlier progress, the most significant departures were made in transportation and communication, in the production of metals, in the generation of power, in the introduction of new materials of prime value to our civilization, and in the opening of new lands to cultivation and settlement. Certain details may illustrate these points more clearly.

Railroad Construction After 1870

Extensive railroad construction in Europe got under way in the 1840's, but no European country had its complete railroad equipment in 1870. Great Britain, which seemed to have the most nearly adequate system in 1870, invested 40 per cent as much capital in new construction between 1873 and 1884 as had been

invested since the beginning of the railroad era. The number of passengers carried on British railroads averaged 190,000,000 a year in the four years ending in 1864; 282,000,000 in four of the five years ending in 1869; and 652,000,000 in the quinquennial period ending in 1884. Freights increased from 97,000,000 to 253,000,000 tons in the same interval. The annual gross railway and canal profits increased from £19,000,000 to £31,000,000.

Great Britain was intimately concerned in the railroad development of many other countries in this generation. She provided capital, made the equipment, and profited by the economies affected by railroads in the United States, South America, India, and the British colonies. In the United States there were 35,000 miles of railroad in 1865. By 1870, 52,914 had been built; by 1873 the figure for 1865 had been doubled, and by the end of 1879, 86,000 miles had been finished. Although Europeans considered that too much railroad had already been opened in America, they failed to estimate correctly the American genius for expansion. The construction for the next five years (1880-1884 inclusive) equaled the total construction from the beginning, in actual number of miles of line, of Great Britain and France together, and brought the American figure to 125,000 miles in 1884. By 1900 it was 189,295 miles. A great British authority said of this American achievement, "If a single national contribution toward the making of the new era had to be selected for its worldwide importance, it would probably be this!"

In 1870 India had something over 4000 miles of line; the rest of Asia, almost none; all of Africa less than 1000 miles; Australia, 1000 miles; and South America, 1000 miles. By 1900 India had 22,491 miles of line and the rest of Asia, 13,500 miles; Africa had 12,500 miles; Australia, 14,675 miles; and South America and the West Indies, 27,874 miles. The total mileage of railroad throughout the earth rose from 24,000 miles in 1850 to 110,000 miles in 1870, 239,000 miles in 1880, 386,000 in 1890, and 479,900 miles in 1900.

The Steamship

On the sea equally significant developments occurred. The British figures of ship tonnage outweighed all others. In 1870,

Great Britain had 4,457,000 tons of sail ships and 1,113,000 tons of steamships. By 1880 the steam tonnage had risen to 2,273,000 tons. The gain was counteracted to some extent by the fall of her sailing tonnage to 3,851,000, of which, however, 1,394,000 tons had been newly built since 1870. By 1890 the figures were 5,042,000 tons of steam, and 2,936,000 tons of sail, and in 1900 there were 7,207,000 tons of steamships on the British registry, and 2,096,000 tons of sailing ships. It is possible that the 901,000 tons of steam tonnage on the British register in 1865 did more work than the 4,937,000 tons of sailing ships of the same year, writes one British authority, and certain that in 1875 the 1,900,000 steamer tons did more work than the 4,200,000 tons of sail. By 1885 the nearly 4,000,000 tons of steamships, with their crews of 108,000 men, may well have done from six to seven times the work of 3,400,000 tons of sailing ships, with their 91,000 men. The steamship increased in efficiency so rapidly that ships built in 1875 could not compete with those built ten years later; and those built in 1885 were outmoded in 1895.

In 1874 A. C. Kirk took out an English patent for the triple expansion engine. This came into general use about 1881. At from 150 to 200 pounds steam pressure this engine used only one and one-half pounds of coal per horsepower per hour. In 1894 came the quadruple expansion engine, which, working at 225 pounds pressure, reduced coal consumption to one and one-quarter pounds per horsepower per hour. Between 1884 and 1897 Mr. C. A. Parsons invented the steam turbine, an even more efficient motor than the quadruple expansion engine. This was not used, however, in large steamships until after the beginning of the new century. The invention of the surface condenser in the 1870's reduced the amount of fresh water a steamer had to carry and so made possible greater cargo space on long voyages.

To make the seaways more effective, the Suez Canal was opened in 1869. By 1879, 2,263,300 tons of shipping were passing through it. By 1884 the widening and deepening were begun, and in 1886 its 500 franc shares were selling for 2000 francs. In 1889 the tonnage passing through the canal rose to 6,783,000 tons.

Binding the world intimately together through the possibility of instant communication were the new telegraph and cable lines.

In 1876 the invention of the telephone brought the possibility of even closer contacts, at first between individuals of the same locality, and presently between persons living in more distant places.

Prices and Wages

The improvement in the means of communication was one very important element in the economic advances made during this period. Another factor was the increase in consuming power on the part of the masses of the people made possible by a steady fall in prices and a general rise in wages. For some years before 1873 money wages had been rising. From 1873 to about 1877 the rates of money wages either remained steady or in some cases continued slowly to go up. After 1877, and continuing to 1886, there was a fall in money wages. Yet this was not universally true, and the recession did not go back to the levels of 1870. In other words, the increase in wages which began between 1850 and 1865, depending on the trade, and continued to 1876 or 1877, was substantially maintained until a new rise began in the late 1880's or the 1890's. There was also a tendency for hours of work to be reduced. One authority estimates that the average rise in money wages in Great Britain between 1850 and 1886 was 48 per cent, with still further increases down to 1900.

Even more significant than the fact that money wages in general rose is the fact that the cost of living did not rise but actually fell, even after allowance was made for considerable increases in rent to provide better housing and to help pay for the rise in value of urban land. The reduction of living costs was due to a remarkable fall in prices which began about 1874 and continued into the middle 1890's. This fall in prices represented one of the processes by which the new economies and efficiencies in production were transferred to the consumer. Great social advantages lay in these lower prices after 1873. At the same time certain disadvantages must be recognized. Hardships were created by price reductions in two cases particularly. The first was when there were rapid fluctuations downward in consequence of the sudden cessation of business activity, as happened when the spending of the German indemnity stopped, American railroad construction was interrupted, or orders for British ships suddenly fell off. Manufacturers and dealers, not protected by hedging,

caught with large stocks of materials manufactured or purchased on the basis of higher prices, had to sacrifice their goods for what they could get. The second case, which was far more serious, grew out of the reduced purchasing power of the agricultural areas of the world, both in Great Britain and elsewhere, adversely affected by the fall in value of agricultural produce.

Apart from these cases the long-pull fall in prices due to greater efficiency of production was extremely beneficial. It made for a degree of prosperity among the masses of the people by maintaining and even increasing their real wages all through the period. The vast consumption of the cheaper commodities thus achieved brought about an intensity of production hitherto undreamed of. Without this increase in mass consumption due to price falls, it is indeed hard to see how industry could have found the large-scale markets which alone made the new methods of manufacturing practicable.

An effect analogous to that produced by the fall in prices was created by savings and economics in the cost of distribution. One of the greatest evils in modern society lies in the fact that retail distribution costs are excessively high. Ordinary commodities even at the present time must stand a mark-up of from 60 to 100 per cent of the wholesale price to make it possible for the retailer to do business. The growth of the department stores in this period, such as Harrod's in London, did something to reduce prices and give to the retail purchaser a guarantee of quality. The same result was achieved through the cooperative society retail stores and through the chain grocery stores, such as Lipton's, which came into their own in this period.

Industrial Progress

The improvement in the means of transportation and communication, which materially contracted the size of the earth and lessened distances in terms of time, was partly made possible by, and was partly responsible for, a most significant development in the production of coal and metals. In this every industrial nation shared. The production of pig iron, to give but one example, had reached a total, for the great iron-producing countries of the world, of 11,565,000 tons in 1870. By 1900, the world production was 30,000,000 tons. The transition from the employment of

puddled iron to the use of steel, already under way in the 'sixties, continued apace and was aided by the discovery, in 1879, of the Thomas-Gilchrist process of using basic ores, which has already been described. New steel mills were erected rapidly all over the world, and the age of cheap steel, adaptable to almost any purpose, was beginning.

Many of the advances of the period were due to scientific discoveries and their application to industrial life. There was the closest association between the proficiency of pure science and material progress. The research student and the technician united to turn their enhanced control over the forces of nature to the service of mankind. Perhaps the most brilliant achievement of this kind lay in the field of electricity. Almost simultaneously, in 1867, Siemens, Wheatstone, and Varley perfected the design of the electric motor and generator, which made possible both the production and the utilization of electricity as power. Shortly afterward practical electric generators were being built. At the Centennial Exposition in Philadelphia in 1876, electric current was utilized for lighting purposes. Three years later Siemens and Halske experimented with an electric tram line in Berlin. In 1883 3 horsepower of electric current were transmitted 25 miles by wire.

The supremacy of steam as the source of industrial power was threatened not merely by electricity, but from another direction also. During the 1860's there had been a good deal of experiment with the internal combustion motor, using coal gas as a fuel. Among the many other wonders exhibited at Philadelphia in 1876 was the Silent Otto Gas Engine, invented by Dr. N. A. Otto. The flywheel had such a kick that it frequently knocked down the men who turned it over to start the machine. Ignition was furnished by a hot tube, and the engine worked at a speed of from 150 to 200 revolutions per minute. During the 'eighties Gottlieb Daimler hit upon the idea of making an engine with lighter parts which should attain the same horsepower by increasing the speed to 800 or 1000 revolutions per minute to compensate for the weaker impulses.

During the 1890's the high inefficiency of the best steam and gas engines interested a German engineer, Rudolf Diesel, in the possibility of an engine of original design which would convert more of the latent energy of the fuel into power. In 1897 he

perfected an internal combustion engine using crude oil as a fuel in which the ignition of the oil was brought about by very high compression, of from four to five hundred pounds per square inch, within the cylinders. The efficiency of this type of engine, greater than anything previously known, was to some extent offset by the high cost of manufacture, and in his discouragement regarding financial success, poor Diesel committed suicide. Yet the fact that twelve dollars' worth of oil in a Diesel engine did the work of fifty dollars' worth of coal under a steam boiler soon attracted the interest of industrialists and of shipbuilders. The Diesel engine did not become important, however, until about 1910.

The replacement of hot tube ignition by an electric spark and the development of a device to use vaporized gasoline as a fuel made it possible to think of the gas engine in connection with self-propelled vehicles. In 1886 Daimler actually attached such a small engine to a bicycle, and on March 4, 1887, he drove his first motor car through the streets of Hanover, Germany. In the same year Messrs. Panhard and Levassor, then engaged in making wood-working machinery in Paris, purchased the French rights for the use of Daimler's motor. They developed a transmission system for use in the new horseless carriage, in which during the 1890's much interest began to be taken. Automobile races began to be held in France. The winner of the 1895 race from Paris to Bordeaux and return, 744 miles, averaged 15 miles an hour. The year 1896 saw the repeal of the English locomotive law, which prohibited the passage of self-propelled vehicles on highways at more than four miles an hour, and required that a man carrying a red flag should precede such vehicles. Nevertheless, Queen Victoria never set foot in a motor car.

New Basic Materials

Finally, two further advances must be considered. Through the extension of scientific investigation a host of new materials were developed for the service of mankind. Petroleum was known during the first half of the nineteenth century only as rock oil, a thick fluid which was found oozing from rocks in certain parts of the United States and was used for medicinal purposes. In 1859, in western Pennsylvania, Mr. E. L. Drake drilled the first oil well, and twelve years later drilling for oil began all over the world.

The Galician and Roumanian fields were opened in 1878 and 1880; those of Java, Sumatra, and Borneo between 1883 and 1896; and those of Burma in 1890.

Near the close of the Second French Empire Napoleon III offered a prize for the best substitute for butter. The award was won in 1869 by Hippolyte Mège-Mouries, who made oleomargarine by churning oleo oil, derived from beef suet and other fatty substances, with milk. His process made available for human food various organic oils, particularly the cocoanut and other palm and nut oils of Africa and the South Sea Islands. The European occupation and exploitation of the islands of the Pacific during the 1880's was a direct consequence of the study of the chemistry of vegetable oils and the possibility of their use by western Europeans for food purposes.

Portland cement had been invented in 1824 by an English bricklayer, Joseph Aspdin. Forty-three years later J. F. Monier, a French gardener, used some iron bars to strengthen a mass of cement used in making a base for a fountain. Monier patented the idea and developed the system of ferroconcrete or reinforced concrete construction, which began to be used widely in Europe during the 1880's.

Rubber had been known in Europe since the latter part of the eighteenth century. Attempts to use it for anything else than erasers were unavailing, because at summer temperatures the rubber became soft and sticky and raised an evil smell and in cold weather it cracked. In 1844 Charles Goodyear patented his process of vulcanizing rubber with sulphur, which made rubber practicable for overshoes and mackintoshes. Only in 1883, however, did rubber become a really significant commodity, when Charles Dunlop used it in the construction of the first pneumatic tires for bicycles. Twelve years later rubber automobile tires began to be manufactured.

Coal tar, the black, malodorous, sticky residue remaining in retorts after coal had been distilled for illuminating gas, was another material which during the last quarter of the nineteenth century entered in an important way into the business of everyday life. Chemists had long been intrigued by the problem of finding a use for it, and in the 1850's W. H. Perkins, of England, produced from it a purple dye, the first aniline color. In 1868 Graebe and Liebermann astounded the scientific world by prepar-

ing alizarin, the coloring principle of the madder root, from coal tar. In 1880 Baeyer produced indigo synthetically from coal tar.

The fields of the western world were enriched by new varieties of fertilizer, which made possible the complete transformation of the agriculture of great areas. Of these new fertilizers the most important were the Chilean nitrates which lay in great deposits hundreds of square miles in area in northern Chile and the phosphates produced in Germany.

Through the extension of the railways and the increasing number, size, and efficiency of steamships, land areas larger than the whole of western Europe were brought within the reach of English and European markets. The rapid colonization and cultivation of the United States west of the Mississippi River, of central and western Canada, of the frontier country of Argentina, Uruguay, and Brazil, and of the hinterland of South Africa and Australia followed, and their inestimable supplies of cheap wheat, cotton, wool, mutton, beef, and leather were made available for the world. Probably for the first time in history the European peoples, at least, had enough to eat and to wear. The Chinese and the Indians were still stricken with famine, but the very possibility of that phenomenon had been eliminated in British, western European, and American life.

The Tempo of Living

There is still another factor which must be considered as an element in the constantly mounting levels of production. This is the increasing tempo of British, European, and American life, the heightened speed at which people moved, thought, acted, produced, and consumed. In part this was the expression of the accommodation of European nerves to the faster operation of machines which their constant improvement made possible. The desire for more of the same thrill which the initially increased tempo had given may explain the unremitting search for still greater mechanical perfection which would lead to still faster operation. Superficial indications of what was a fundamental psychological condition common to European peoples are to be found in the new speed records of the day. In 1890 the fastest scheduled time of the fastest British trains was 54.12 miles per hour; in 1900 it was 59.09 miles per hour. In 1873 the steamship

Baltic held the record for the North Atlantic crossing by a trip in 7 days, 20 hours, and 9 minutes. In 1888 the *City of Paris* cut the time to under 6 days. In 1903 the *Deutschland* made a record of under 5½ days, and in 1910 the *Mauretania* crossed in 4 days, 10 hours, and 41 minutes, making a record which was to stand for the next generation.

Changes in Industrial Organization

On the extended scale on which business operations were conducted during the period under discussion, the regular capitalization of the several varieties of industrial enterprise no longer sufficed for all the different activities which they carried on. Manufacturers imitated merchants and commercial houses in resorting to credit and borrowing from banks. In response to their requirements powerful industrial banks, such as the Bank of Liverpool and Martin's, came into existence. Such financial houses not merely provided credit and loans but went further to float securities and even to promote new companies. Banks were largely responsible for many industrial developments of the Empire, since they fostered and built up manufacturing undertakings.

In the later years of the period, as the progress of transportation lessened the time and cost factors in distance, businessmen tended to extend their enterprises over larger areas. Firms which had heretofore manufactured for a single district enlarged their plants to supply the nation. Companies which already had national markets entered international trade. After a brief period of intense rivalry between the expanding companies as they came into competition with each other in the larger areas, the advantages of agreements, apportionments of markets and output, and amalgamation came to be apparent.

In Germany the movement took the form of the organization of cartels or associations of companies engaged in the same lines of business with a view to maintaining prices, fixing output, and apportioning markets. In England and the United States the trust was the more common result. Firms engaged in particular lines of production were brought under common control through purchase or merger; and to the economies of production in larger units thus made possible were added the reduction of overhead through the elimination of numerous managements. Unfortu-

nately, the trusts frequently passed on their savings in production costs to their stockholders in the form of dividends on "watered" stock, instead of reducing prices to consumers. The public, moreover, became alarmed at the monopoly conditions which began to appear in many lines of production, and their protests resulted in restrictive legislation.

The tendency toward expansion and amalgamation did not stop at the national frontiers, but manifested itself in international and worldwide forms. Companies such as the Singer Sewing Machine Company might set up branches and agencies in every country in the world. The Nobel Trust, a Norwegian concern, made the world's dynamite; the Solvay Syndicate, a Belgian corporation, dominated the production of soda. There might be agreements, pools, and even outright amalgamations in the case of important industrial enterprises in different nations. Steamship companies had pools or conference agreements which fixed rates and even pooled or apportioned business for every trade area of the world except the freight traffic of the North Atlantic. In the passenger traffic of the North Atlantic, the conference regulated the price of every grade of accommodation. Various International Steel Rail Syndicates, including the steel-makers of the United States, Great Britain, Germany, France, and Belgium, divided the export trade in steel rails among the steel mills of the various nations. One particularly important phase of the trend toward larger units was the growth of the great joint stock banks, which opened new branches and bought up smaller local banks in considerable numbers. With the concentration of control over capital and credit thus brought about, bankers and financiers acquired opportunities of an important kind to influence the course of industrial development.

The World of Labor

The increasing size of industrial units made it more than ever impossible for the ordinary workingman to become his own boss. The impersonality of the new set-up, where highly trained technicians, trade experts, and engineers received salaries for running a business on behalf of an anonymous group of investors whose liability was limited and who expected maximum dividends, rendered impossible those human touches between the owner and

the men which in the earlier days of the factory robbed the antagonism of interests between capital and labor of some of its bitterness.

Growing more conscious of their common interests as their numbers increased, the workers organized into unions to pit their collective force against the power of their employers. Wherever trade unionism appeared it was bitterly opposed by the employing classes, since the trade union demand for higher wages and shorter hours threatened profits, and by the governing classes because the strike, the final sanction for trade union demands, was apt to lead to violence and disorder. Yet as the growth of democratic sentiment led to the extension of the franchise among the workers, they were able to exert sufficient political pressure to secure complete or partial legalization of trade union activity. In England trade unions received full authorization to carry out all necessary functions in 1871 and 1876. The years of great stress preceding this action led to the assembly of the Trade Union Congress, which met first in 1868, as a sort of parliament of labor. Made up of representatives from the entire British trade union world, it spoke for labor, formulated its program, and fought for its interests. The annual sessions of this congress soon came to be one of the most significant meetings in England, and at the present day its resolutions are closely studied by every politician.

Even after the legalization of union activity in 1876 the English trade unions enrolled only a comparatively few workers, generally those in the most skilled trades. The trade unionists continued for a long time to oppose the organization of the unskilled workers, owing to a feeling that any advance made by the unskilled might be at the expense of the skilled workers. It was not until the last decade of the nineteenth century that the "new unionism" of unskilled workers made any headway. It should be noted, moreover, that the legal position which the unions had secured in 1876 was by no means finally accepted by the employing classes. Just at the turn of the new century all that had been won seemed endangered by the decision in the Taff Vale case. In this a railroad in Wales sued a trade union for damages for losses incurred by the railroad as a result of a strike. The highest English court gave its decision in favor of the railroad company. The political power of the unions, thanks to the heavy recruiting among the unskilled workers since 1890 and the organization of the Labour

Party in 1901, was great enough, however, to secure a new statute, the Trade Disputes Act of 1906, rectifying the setback given in the Taff Vale decision.

Some Statistics of Production and Wealth, 1870-1900

Thanks to the growing perfection of the science of statistics, it is possible to give some more or less accurate figures to show the volume and value of the unparalleled industrial activity of the times. In Great Britain national wealth increased from £6,100,000,000 in 1865, to £10,037,000,000 in 1885, and £13,500,000,000 in 1900. The total earnings of all employed persons were £418,000,000 in 1866, £521,000,000 in 1884, and £2,300,000,000 in 1909. In view of the fact that prices fell steadily from just after 1870 (1873) to just before 1900 (1895), the increase of the volume of production on the farm and in the factory is greater than is indicated by the figures given above. Real wages, moreover, tended to rise during most of the period.

Birth Control

While it may be granted that the good life is not based on material possessions, in this world at least a certain minimum of material possessions is indispensable for the pursuit of the highest possibilities of human development. That necessary minimum which during the past centuries Britain, in common with the rest of Europe, had not been able to provide for her people was now within the bounds of possibility. Science, the new lands, and the development of transportation and communication, in the last quarter of the nineteenth century, provided supplies in such abundance that, had anything like equitable distribution been possible, there would have been enough for all to have the minimum material basis of the good life. There is one further matter which must be understood. Always in the past any increase in subsistence materials had been followed by a rapid acceleration of the rate of increase of the population. This seemed to be so generally true that in the beginning of the nineteenth century Thomas Robert Malthus had formulated his observation of the facts into a law to the effect that population constantly impinged

on the means of subsistence. But the people of Europe of the 'seventies and 'eighties found through science another discovery which made it possible, for the first time in western history, to control the rate of births, to prevent the rise of the population as fast as the increase in subsistence materials, and to make possible the actual attainment of a higher standard of living by the masses of western mankind. The development of contraceptive methods, in the early part of the last quarter of the nineteenth century, is thus one of the most significant facts in modern history. No longer is every advance in material resources to be absorbed at once by the necessity of feeding more mouths. In every western country except Russia, particularly after 1885, there was a decided fall in the rate of births. In some countries only the decreasing mortality rates made possible by greater medical knowledge and better supervision over public health and sanitation kept absolute population figures on the upward trend. The iron law of wages seemed to be negated by this practice of birth control.

The Curse of Unplanned Economic Development: Hard Times

The intense economic development of this period, perhaps the most rapid in human history, went ahead without much conscious planning or motivation except that provided by profits on the one hand and by the trusts, cartels, and labor organizations in a limited way on the other. Private enterprise, operating for its own advantage, went ahead without much thought of the social implications of its activities. If ever anyone stopped to consider the meaning of industrial enterprise at all, he started with the Pollyannaish assumption that every increase of production on which a profit could be made was for the best interests of society, the nation, and the world.

This haphazard process of industrial development was attended by serious maladjustments throughout society, which took the form of losses of capital, stoppages of factories, unemployment, and financial crises. While these phenomena had been constantly present in some measure in all modern periods, they were accentuated in the last quarter of the nineteenth century. Their combined effects have taken the form of the appearance of depressions. Such depressions have been international in scope since

1763. The great depression of the last quarter of the nineteenth century, which lasted from 1873 to 1886, was more than international; it was worldwide in its operation.

While the production of wealth went on during these years with only a slight slackening in pace, the evils of "hard times" were very real. In Great Britain and all other western European countries and in the United States and Canada there arose the cry of unemployment, slack times, low profits or huge losses, bankruptcy, and general stagnation of business.

England, the greatest of the industrial states, felt the depression with sharpest force. The fact most stressed in the standard accounts of the English slump was the rapid expansion of business after 1866. This was further stimulated by the Franco-Prussian War and by the financial operations and the German purchases of British goods connected with the German receipt and spending of the indemnity from France. Simultaneously there had been extremely rapid railroad building in the United States and elsewhere throughout the world, in which British capital and industry had been concerned intimately. The concurrent rise in the price of materials, wages, and coal had enhanced the working expenses of the new lines, so that their traffic receipts could not keep pace with their obligations. Meanwhile a crash in Vienna in May, 1873, prevented the floating of further railway bonds in Europe. A commercial crisis came to a head in the United States in September, 1873. The combined European and American situations led to fiscal stringency in England. Prices shrank and unemployment appeared. In 1875 failures amounted to no less than £50,000,000, of which only 10 per cent was ever realized. Various factors contributed to prolong the depression thus initiated. The crippling of French industry by the war, the indemnity, and the Commune of 1871 relieved English business houses not only of competition but of customers as well. The demonization of silver by Germany in 1873, the silver action of the Latin Union in 1874, which limited the coinage of silver in Italy, Spain, and France, and the enhanced production of silver in America led to a fall in the value of silver as compared with gold. There followed a contraction of English exports to the countries of Asia, which remained on a silver standard. The seriousness of this single factor will be recognized from the fact that one-half of all British cotton goods exported normally went to countries

with a silver monetary standard. Bond repudiations in Turkey, Egypt, and Paraguay and the cessation of interest payments on American rails cut down the purchasing power of another important class of consumers of British goods, as represented by English bondholders.

A still more significant phenomenon in British economic life was the collapse of British agriculture in face of the world decline in prices of agricultural products after 1874. As organized, British agriculture must receive prices which would give an average value-to crops of £5 per acre. America was prosperous when crops had a value of \$14 or \$15 an acre, and American farmers went ahead opening new lands to grow wheat, corn, and meat with unprecedented speed. The development of the railroad and the steamship made it possible to bring the agricultural products of the United States and other areas in South America, South Africa, Australia, Russia, and India into effective competition with British wheat, wool, and meat in British markets. This was particularly true after 1877, when the series of hostilities which had interfered with the freest offering of foreign wheat in English markets ended with the Russo-Turkish war.

The British agriculturalist was particularly vulnerable in that, unlike the French and German farmer, he had no tariff protection against the agriculture of the outside world. Moreover, the evils necessarily incidental to the inauguration of an era of competition between old high-cost and new low-cost agricultural areas were accentuated by the fact that there was in Britain a series of poor harvests after 1874. Between that year and 1882 there were only two good crops. The British farmer not only could not get a good price; he had little to sell. The persistence of low prices, though a matter of great advantage to the industrial population, was ruinous to the agricultural classes. The cheap wheat of America, Russia, and India, the wool, and, after the introduction of refrigeration ships in 1880, the meat of Australia and South America not only fed and clothed the English workman but swamped the British farmer. In the single year 1885 the decrease in purchasing power on the part of the British agricultural classes was estimated at £42,800,000. In this same year, thanks to the bounty of nature and the rapid opening up of new lands, the prices of agricultural products were so low that the

value per acre of the ten main crops combined in the United States was only \$9.72.

In the later years of the depression, from 1882 to 1886, characteristic features were that the volume of business was fairly maintained but that prices fell constantly. There was a diminution of profits until many industries ran with little or no margin of earnings. Among the workers there was much unemployment and a widespread lowering of earning power, due, however, to short working time rather than to any serious reduction of wage scales.

Throughout the whole period there was the greatest fluctuation in business activity. There is no escape from the fact that all through the era of unprecedented increase in wealth throughout the world, people complained of stagnation and retrogression.

The student of social phenomena is faced therefore in the fourth quarter of the nineteenth century by the strange paradox of extraordinary production and accumulation of wealth running concurrently with a long period of business depression. Contemporary investigators sensed the problem. Thus British consular agents, surprised that statistics of certain foreign areas showing growing volumes of trade did not corroborate the opinion of depression, speculated on the meaning of their figures. They suggested (and they were right) that the reduction of profits furnished the criterion. The majority report of the British royal commission of 1886 recognized that production had increased at a rate in advance of the growth of the population and was inclined to minimize the depression in particular industries or among particular classes of producers as an indication of a corresponding national loss. The minority report of the same commission insisted that not the volume of production but profitable trade was the measure of prosperity; that mere activity and even increase in production were by no means synonymous with prosperity.

"Overproduction"

In the contemporary discussions of the causes of the depression much attention was paid to "overproduction." One economist asserted that as the result of the work of the past fifty years the civilized world was fully equipped with economic tools. The

work of the future must be repair rather than construction. It was believed that the discovery of new processes of manufacture would continue and would act as an ameliorating influence, but "it will not leave room for a marked extension such as has been witnessed during the last fifty years or afford remunerative employment for the vast amount of capital that has been created during that period." Prices and profits would continue low. There was room for further intensive, but not extensive, development in the present area of civilization. Outside that area, in China, Japan, India, Australasia, Persia, and South Africa there was still much to be done, but it would be done slowly.

It is now obvious that the world which had scarcely a telephone or an electric light outside a few of the great cities, no high tension power lines, not a mile of concrete highway, or an automobile, not a radio sending or receiving set, not a moving picture theater or a skyscraper, no airplanes, dreadnaughts, submarines, and not even a steamship as large as 20,000 tons had not built up its supply of machines and tools so completely that any production of such things was superfluous.

There was some overproduction of goods that could not be disposed of in the current period and had to be carried over. Such carryover, even though small, was sufficient to clog an industry, send prices down, and lead to the stoppage of plants and the discharge of workingmen. More serious, as a form of overproduction, was the construction of facilities beyond the immediate requirements of the world in the expectation of usefulness which did not develop as rapidly as had been expected. This was particularly true in the case of railroads in the American west, of ships in the British registry, and of new steel plants everywhere. The first result was undue competition and sharp reduction in prices, even below cost. In the case of British shipping, for example, where the opening of the Suez Canal stimulated the building of iron steamers, the high profits of the twin cylinder ships of the early 1870's led to the flotation of shipping companies even in the inland towns. In the four years from 1881 to 1884 inclusive steamships amounting to about two-thirds of the total tonnage existing in 1880 were built. The market was stocked with cargo vessels beyond the requirements which materialized, and there was a most disastrous decline in rates as ships competed with each other for freight.

Yet even this sort of overproduction was really less significant than was popularly supposed to be the case at the time. It was responsible for certain sharp price recessions in certain years in particular industries. It was temporary in its reactions and ceased to be effective when anticipated use took substantial shape.

More Efficient Production

Of greater consequence was another process called overproduction which was in reality a completely different phenomenon; that is, more efficient production. Better ways of producing commodities brought long-term price declines. The older and less efficient plants which fell below the level of the margin of profitable use had to be scrapped, and obsolescent capital was destroyed. British shipping again provides an example. Although excessive competition was in part responsible for the low freight rates which became established in the late 1880's, the fundamental factor in their permanence was the high efficiency of the new steel ships with their tricomponent engines and high pressure boilers. Older ships, even some built within the past ten years, had to be rebuilt or were forced off the seas. In 1886 an official of an important shipping company testified that certain new steel ships cost originally 20 per cent less, burned 17 per cent less fuel, and cost 15 per cent less for maintenance and insurance than ships of the same capacity built seven years earlier. Owners of older ships were forced to reduce the rate of their earnings and to assume large capital losses.

Closely related to this type of more efficient production were changes introduced by new technical processes or new machinery which led to the introduction of a material of greater efficiency or lower cost than one previously used. Here the classic example is the displacement of puddled iron by steel. With the invention of the various new ways of making steel cheaply, culminating in the Thomas-Gilchrist process in 1879, steel production rose rapidly and the making of puddled iron declined. In 1884 there were still 4577 puddling furnaces in operation in Great Britain. In 1885 there were only 3876. Within a few years an entire industry with its vast capital value had been made obsolete by the rise of steel, and the laboriously acquired skill of thousands of puddlers was rendered worthless.

The Agricultural Problem: "Overproduction" of Food

An analogous situation is provided by the entry of the farm products of new lands in America, Africa, and Australasia into the older American and European markets. The richness of the virgin soils, their freedom from taxation and from the accumulation of historic burdens made it possible for farmers on the new lands to produce wheat and meat at prices impossible in the older areas. A farm expert testified before a British commission that an acre of land in England bore a rent charge of 15 shillings, a tithe charge of 2 or 3 shillings, local taxes of 2 or 3 shillings, and an arbitrary assessment for the income tax of one-half the rent, beside other taxes, such as the old land tax. The cost of manuring an acre of such land was five times the cost of transporting the yield of an acre of wheat from Chicago to Liverpool. In America there was no tithe, and no national taxation on the land. The local taxes at the moment were estimated at 12 cents an acre. In England the land supported the church, the state, the landlord, the farmer, and the farm laborer. In America it supported a few roads and the farm owner. In England land must yield £5 per acre to make farming pay. The virgin soil of the American West could be bought and paid for, plowed, sown, and harvested for \$15 an acre. The average value of the annual yield of an acre of land in America was over \$10 in the majority of the years between 1870 and 1900, and in some years over \$15.

Until the late 1860's the lack of adequate railroads and ocean shipping gave Europe the protection of isolation from these cheap and unburdened new lands. But the development of transport by land and sea brought the grain of America, the wool of Australia, and the meat of Argentina and New Zealand to Europe in a flood. This was true of wheat after 1874 and of meat after the perfection of the refrigerator ship in 1880. When freight rates fell to less than one shilling a bushel from Chicago to Liverpool, the new prices of wheat set by the production costs in the American West ruined the farmers of Europe and brought their children to America. It was not so much a question of overproduction as of cheaper production in such volume as to make impossible the maintenance of the prices necessary to make farming

in the older countries pay. In England alone the number of agricultural laborers fell off from 996,000 in 1871 to 798,000 in 1891. The unneeded laborers of the country were drained to the cities to curse the already overstocked casual labor markets there. Rents fell by £11,533,000 a year between 1879 and 1893-1894.

Excessive Supplies of Capital

An integral part of the whole industrial and agricultural development which has already been sketched was the accumulation of immense amounts of capital, in the form of cash, farms, goods, mines, factories, mills, railroads, ships, and other productive agencies. Capital itself has a price; when it is available in volumes in excess of effective demand, that price tends to fall. It was a universal lament on the part of business leaders that the rate of profits was sharply diminished. One witness before a parliamentary commission went so far as to say that the only depression he knew about was the rate of profit he got out of his business. Some students even suggested that increases in production might not be synonymous with prosperity. To their minds the rate of profits furnished the criterion by which times were to be judged good or bad. No longer was it possible for factories to pay 15 per cent to 20 per cent a year profit; owners had to be satisfied with 5 per cent or $7\frac{1}{2}$ per cent. Sir James Caird, first land commissioner of Great Britain, said that it was hard to get more than 4 per cent in investments that could be relied on. Yet this does not mean that great fortunes were no longer to be made. For with smaller rates of return greater volumes of business heaped up larger fortunes than the past had ever known. But the great class of dividend-receiving investors with fixed capitals were forced to accept serious reductions in their incomes even where their capital sums were unaffected by losses.

The Incidence of the Depression

It will be seen from this discussion that the depression of the period 1873-1886 was limited in its incidence. It affected only certain individuals and classes. First among those affected were the capitalists whose investments were destroyed by the elimina-

tion of marginal units in industry or agriculture, or who had gone ahead with extensions which present use did not justify. Investors were affected also more generally and more permanently by the diminution in the rate of profits and lower returns on their capital.

As a necessary corollary to capitalist losses was the unemployment of workmen. The closing of marginal and submarginal units threw skilled men everywhere on the labor market. Machines which replaced human skill and effort created technological unemployment on a considerable scale. The stoppage of railroad, steamship, or building construction laid off thousands, and millions throughout the world suffered from the effects of part time. No accurate statistics were kept in any country, but some estimates are available to indicate the amount of unemployment. In Great Britain the data refer particularly to 1879 and 1886, which happen to have been the two worst years. The ironfounders had an average unemployment of 13.9 per cent in 1886; the Associated Blacksmiths, 14.4 per cent; the boilermakers and iron shipbuilders, 22.2 per cent. These are the largest figures. The Amalgamated Engineers and the United Carpenters and Joiners had 7 per cent. Perhaps the average in all trade union trades was 11.4 per cent in 1879 and 9.5 per cent in 1886. The figures of one authority for the 14 years from 1873-1887 give 9.3 per cent. The unskilled and non-unionized trades were certainly higher; yet in 1888 Alfred Marshall astonished a royal commission by telling them that in his belief there had not been "a larger number of people unemployed during the last ten years than during any other consecutive ten years."

From what has been said it will be recognized that the depression of the 'seventies and 'eighties was not a single phenomenon but that it consisted of a number of different factors each of which were brought in about the same period to a point where there was a need for a considerable amount of readjustment. British agriculture had to be reorganized on a basis which took account of conditions in America and other colonial lands. Older industry was seriously affected by new processes and new machinery and certain types of plants had to be transformed to meet newer conditions or weeded out altogether. Capital had increased to such an extent that it could no longer expect the high returns of a past period and interest rates on investments

in industry had to be readjusted to conform to the situation. Above all, certain social conditions, such as the lack of security on the part of the masses of the people and their dependence on their jobs in an unstable and fluctuating order, were more clearly revealed than ever before. In a society as rich as that of Great Britain, this insecurity seemed to many thinkers a monstrous thing and at an early date they began to offer plans to remedy it.¹

¹ See references at the end of Chapter 27.

Chapter 27

IMPERIALISM AND SOCIAL REFORM, 1870-1900

Remedies Against the Suffering Caused by the Depression

ALTHOUGH probably not more than 10 per cent of the people of Great Britain, Western Europe, and America were adversely affected by the series of industrial and agricultural changes which constituted the depression of the period 1873-1886, many circumstances united to give extraordinary force to their wretchedness. The discontented and the disinherited were numerous and important enough to call attention to their plight and to undertake themselves or to secure from their governments various kinds of remedial measures.

During the long continuance of this great depression it was almost inevitable that it should bring forth numerous suggestions for its cure. The remedies actually proposed at one time or another were probably as numerous as the remedies for curing colds, and they were just as effective. They ran the entire gamut of political, moral, social, economic, and legal devices. Governments were urged to limit the number of apprentices, to industrialize their armies, to assume public ownership of coal and raw materials, and to manipulate the currency in every imaginable way from devaluation (reduction of its "fictitious value") to allowing business to furnish its own circulating medium. The state was besought to educate the masses, reform the franchise, to reduce salaries of government officers and to abolish all unnecessary jobs, to prohibit the taking of interest, to increase the earnings of and reduce the productive power of labor, to open foreign markets, and to see that all that was needed should be

produced at home. Railroads and telephone and telegraph lines, it was said, should be regulated or owned by the government; tariffs should be raised or lowered, abolished or imposed, and should provide revenue or furnish protection; taxation should be abolished, should be laid on incomes only, on capital chiefly, and on all property equally. Navigation acts, the control of over-production, the restriction of immigration, better education, the classification of society in well-defined categories, and the cessation of speculation and gambling in the necessities of life had their supporters, as well as thrift for the laborers, temperance as a cure for bad trade, peasant proprietorship, state-aided emigration, and the single tax.

Nearly all governments tried the fortunes of higher tariffs. Great Britain did not do so, largely because the great manufacturing interests and the working classes both were devoted to the cheap food provided by free trade. Some Conservatives were interested in "tariff reform," by which they meant the re-enactment of a protective system. A certain number of pamphlets were written and some speeches were made on the subject. Yet the leaders of the Conservative Party did not seriously consider the matter, partly because they were as much devoted to free trade as the Liberals and partly because they feared to alienate their supporters among the agricultural workers and the city proletariat by even seeming to be willing to raise the price of food by means of a tariff duty on grain or meat.

On the other hand, the British resorted to railroad regulation on a considerable scale. There had been a certain amount of legislation regulating railroads in the past. In the Cheap Trains Act of 1844 all railroad companies were required to run at least one train a day in each direction, stopping at all required stations, and carrying passengers for fares not exceeding a penny per mile. In 1845 maximum freight charges were fixed. In 1854 a Railway and Canal Traffic Act, often known as Cardwell's Act after the head of the commission upon whose recommendations it was drawn up, directed railway companies to afford all reasonable facilities for the carriage of goods and forbade the giving of preferential rates or favored treatment to certain shippers. Actually Cardwell's Act was not enforced, and down to 1873 the extent of state control over the British railroads was small. In this year, as the result of the report of a committee of inquiry,

a Railroad and Canal Commission was set up, under the Regulation of Railways Act of 1872, to enforce the law prohibiting preferences, to examine proposed amalgamations, to determine the reasonableness of through rates, to adjudicate disputes between companies, and to rule on proposals by railroads to purchase canal companies. Railroad companies were required to keep rate books at every station where they were to be open to public inspection.

The Railway and Canal Commission seems to have ended the evil of preferences, at least between individuals, although certain districts were still given preference as against others. As a result of the experiences of the depression years many new kinds of problems came to the fore. These were largely connected with rates which shippers considered too high, and on all sides there were demands for rate reductions. The companies, however, in view of better facilities which they were providing thought themselves entitled to increases. In 1888 the Railway and Canal Traffic Act established the commission on a permanent basis. District preferences were forbidden by the prohibition of greater charges for a short haul than for a longer haul of which the shorter formed a part. Preferential rates for the carriage of imported ("foreign") goods were also prohibited. The act further provided for the arrangement of classifications of goods and the establishment of new freight rates. These were worked out during the next four years and were to come into force on January 1, 1893. Where the new rates were lower there was no public protest; but in other cases where they were higher the shippers objected. As a result the railroads reverted to their old rates with a 5 per cent increase. The outcry of the commercial and mercantile classes led to new legislation in 1894 which declared that any advance in rates over those prevalent in 1892 should be regarded as *prima facie* unreasonable. The Railway and Canal Commission was empowered to consider all new rates, with the burden of proving increases justifiable by improvements in service resting upon the railroads. The effect of the act of 1894 was to continue reductions in rates where these had been arranged and to prevent increases without the approval of the commission. The result of regulation was first to bring about keen competition among the railroads for additional traffic by which alone earnings could be increased and secondly to lead

companies to amalgamations or working agreements to end unnecessary competition. In 1899 the London, Chatham, and Dover made a working union with the South-Eastern Railway. In 1908 and 1909 working agreements were arranged between the Midland Railway Company, the London and North-Western Railway Company, and the Lancashire and Yorkshire Railway Company. In 1909 the Great Northern, Great Central, and Great Eastern Railway Companies planned a merger, but when Parliament refused to sanction the proposal, a working agreement between the companies was arranged, to accomplish the same ends as would have been effected by a merger.

There was also the introduction of a certain amount of government control over shipping. In 1871, as a result of the evils of overloading, undermanning, and the unseaworthiness of certain kinds of ships the Board of Trade was given certain powers to deal with merchant ships. These were extended in 1873 without doing much to eradicate abuses. Samuel Plimsoll, a private member of Parliament, had already undertaken to arouse public opinion in favor of state-enforced surveys of ships, the abolition of deck cargoes, and the marking of a load line, which should never be submerged, on the hull of every vessel. By the Merchant Shipping Acts of 1875 and 1876 deck cargoes were limited, penalties were imposed for permitting vessels to put to sea in an unseaworthy condition, and the load line was established. Later statutes contained further safety regulations, and these were codified in the Merchant Shipping Act of 1894. The same years which saw public regulation of British shipping witnessed the rise of various kinds of arrangements among shipowners to protect themselves against excessive competition. Of these the most interesting was the "conference," the first of which was arranged in 1876 between the companies engaged in the Calcutta trade. Outright amalgamations sometimes took place between shipping companies. Shippers were induced to continue to use the same line or lines associated in a conference by a deferred rebate system. All these arrangements were defended as contributing to the stability of rates, providing better service, lowering working costs, and eliminating costly expenses for advertising and overhead. In all probability they actually accomplished as much in these directions by private arrangements as was achieved for rail shippers by state regulation.

Economic Imperialism

The interest in tariff reform and in railway rates indicates that businessmen recognized clearly enough that their really basic problem was the extension of their market. Lower freight rates would make access to markets easier. A high tariff would have had the effect of eliminating foreign competition from the home market. Many, however, regarded the home market as inadequate. Business leaders, testifying before investigating commissions, frequently expressed the view that only through the broadening of the export market, particularly in the less developed parts of the world, in Africa and Asia, could satisfactory outlets for surplus production be found. In those areas in which they might be interested they must, of course, have monopoly rights.

Private individuals and groups had to work through their governments. The procedure was generally for some interested company or association which desired to get possession of some area to persuade its government that it had rights in the country and had made heavy investments there which would be endangered if the home government did not secure recognition from other governments or intervene to protect the special interests of the group in question. British statesmen of this period were not always eager to acquire colonies or to be put to the trouble of looking after the special rights of interested groups, and it was often a matter of great difficulty for business interests to secure action. Gladstone, for example, was violently anti-imperialist. He denounced Disraeli's acquisition of Cyprus at the Congress of Berlin in 1878; and after the Boers had annihilated a British column at Majuba Hill in 1881, Gladstone actually restored the independence of the South African Republic which had been declared annexed in 1877. Even Disraeli, who exploited the popular enthusiasm for empire, was more concerned with India and its approaches than anything else. His most significant practical contributions to imperialism were his acquisition of Cyprus from the Turks in 1878, his proclamation of Victoria as Empress of India in 1877, and the purchase, in 1875, of a large block of Suez Canal Company stock from the bankrupt Khedive of Egypt. Of these the annexation of Cyprus was probably valueless, the proclamation of Victoria was done reluctantly after vain efforts

to escape from a promise to the queen, and the purchase of canal company stock was a commercial transaction. Yet British statesmen eventually yielded to the pressure put upon them, and the efforts required of them resulted in the creation of new colonies. There were many variations in the way in which rights in an area might be acquired. When the Khedive Ismail of Egypt neared the end of his resources in 1876 he was advised to accept an Anglo-French Commission to control his finances, together with other restrictions upon his sovereignty. Three years later he was dethroned in favor of his son, and Egypt was placed more completely under the control of the bankers. A native revolt in 1882, at a moment when the French government was unwilling to act, necessitated the restoration of order by a British force, and Egypt became to all intents and purposes a British colony.

On the east and west coasts of Africa powerful trading and shipping companies, such as Sir George Goldie and his Royal Niger Company and Sir William Mackinnon and his East Africa Company, staked out vast provinces for themselves and succeeded in getting their territories recognized as British colonies. In the south Englishmen were interested in the diamond diggings of Kimberley and the gold mines of the Rand. Cecil Rhodes rounded out his enterprises in diamond mines and gold fields with the more idealistic purpose of making all of Africa British in order that it might achieve its highest possible development. As a result the British government was forced to proclaim repeated annexations. In 1871 Griqualand West, including Kimberley, was made part of the empire. In 1885 Bechuanaland became a British protectorate. In 1889 Rhodes organized a chartered company which induced the queen to give them title to Rhodesia and to recognize it as British. Ten years later, chiefly because the independence from their control of the Orange Free State and the South Africa Republic (the Transvaal) interfered with their profits in the gold mines, Rhodes and his associates engineered the Boer War. This resulted in the conquest and annexation of the two Dutch republics by the British empire.

European Interests in Asia

Meanwhile Asia was not overlooked. The situation which developed in Asia shows less clearly on the map since in China

proper political control was not established except in certain leased ports. Here the British modestly satisfied themselves with the Yangtze Valley, the very heart of China. When in 1897 the French and Russian interests questioned British rights by putting up a Belgian syndicate to obtain a railroad concession in the area, Lord Salisbury, the British foreign minister, informed the Chinese of the British claims. The Chinese government, of course, yielded. Three years later the British strengthened their hold on the Yangtze by negotiating the Yangtze agreement with Germany, which provided that if other powers made any move to divide China territorially, Great Britain and Germany would take the regions in which they were interested.

How Did Imperialism Help the Depression?

In these imperialist enterprises of the later nineteenth century there are certain common features. Businessmen interested in them had but little concern with ordinary trade in consumers' goods such as muslin and calico, tobacco and whiskey. The charters of the colonizing companies show that what the imperialist promoters were really after was the monopoly of great capital works in their areas, such as the exploitation of mines, the construction of harbor works, railroads, canals, bridges and roads, telegraph lines, and electric light and power plants, and the management of great plantations producing essential commodities such as rubber, tea, and vegetable oils. Such undertakings seemed to promise returns of 10 per cent or more, a rate no longer possible in Europe; they would afford employment "for these superfluous articles of the present day, our boys"; and above all, they would create a demand for machinery and other supplies which would set British factories going again. The requirements of colonial markets would call into activity the productive forces of the home country in the manufacture of goods which otherwise would not be made or would have no sale. Energy and material which would have gone to waste and been valueless became, as the result of the needs of and orders from Nigeria or Uganda, bridges or railroads with a high capital value. True, a railroad could not be paid for at once by the Ugandians, but they would learn to use it, and the certainty of future profits was just as negotiable a value as actual gold. In a word, the widespread interest

in imperialism in this period both among statesmen and the people grew out of the fact that imperialism promised to transform into wealth the human energy and plant capacity which would otherwise have been valueless. Every ton of steel rails, every electric generator exported to Africa or China represented a way of transforming the work of men otherwise unemployed and the output of plants otherwise idle into exportable capital. What is said here of capital exports to the colonies was, of course, true for any capital exports to any country. The new colonial areas were regarded as especially worthy of cultivation because in them there was a monopoly for the home land.

Under the circumstance that every new colony offered additional opportunity to lessen unemployment and increase the national wealth, a widespread popular interest in the new economic imperialism is understandable. Yet economic imperialism made only a small contribution to the solution of the problems of economic readjustment in Great Britain and other western European lands. The fact is that capital export to the colonies was after all seriously restricted by the cultural position reached by the natives of Asia and Africa. The railroads, harbor works, or electric plants on which 10 per cent had been expected often yielded no profit at all. The costs of suppressing native wars cut heavily into the companies' resources. Many of them went bankrupt. At the same time, owing to the enormous popular support imperial questions were capable of arousing, they came to be of the most serious importance politically. The popular emotional response evoked by the appeals to carrying the white man's burden, by the hope of security through exploiting the savage, and by the sheer delight in red on the map made imperialism a real issue. Foreign secretaries, especially in the absence of any other consideration of importance to justify their jobs, got themselves excited over imperial policies and made alliances and threatened the peace of the world over imperial questions.

There is one interesting link between the current unemployment problem and the nationalist sentiment which imperialism did so much to strengthen. The fact that increases in the military and naval forces took men from the ranks of the unemployed encouraged European governments generally to go ahead with augmentations of their armies and navies. As was true in the more recent period of 1934-1935 there was a direct connection

between unemployment during the 1880's and increases in military and naval establishments. Empty shipyards and idle steel mills might be put to work on cruisers and guns, and there seems to have been no lack of pressure upon governments for orders for new equipment from shipbuilders and armament manufacturers. The wider scope of European interests, as colonies were acquired in the far ends of the earth, seemed to demand larger navies to defend what had been acquired and to cope with distant difficulties. Land armaments, which began their rise in the 1860's, are not altogether explained by imperialism and unemployment, but are connected with the ancient hostilities of European politics. But naval armaments, which began their upward movement in 1884 in the so-called naval scare of that year, engineered by the journalist W. T. Stead for the purpose of enlarging British naval power, would seem to have a real connection with the new imperialist interests of the times.

In 1881 the great nations of the world were spending \$656,000,000 a year on their armies and navies. In 1901 they spent \$1,402,000,000, and ten years later \$1,741,000,000. If armaments be regarded in the same category as other public works, such as public and municipal buildings, parks, and boulevards, which were carved out extensively in the last quarter of the nineteenth century, they may be denominated as among the major stimuli to consumption provided by governments, equal, if not greater, in effect to those created by imperial ventures. As much money was spent in armaments as was invested abroad.

Meditated Solutions of the Problems of Underconsumption

It must be apparent that the economic and social maladjustments of the last quarter of the nineteenth century grew out of the fact that capital goods had increased greatly with the result that productive capacity in certain lines increased also. There was not immediately a corresponding rise in the effective demand on the part of consumers for such goods. Keeping out foreign goods by a tariff or finding dumping places for the goods that could not be sold at home in Asia and Africa in the hope of eventual payment was not enough to keep all factories working, all ships and railroads busy, all workers employed. Public works

and increased armaments were likewise only palliatives. The restoration of the social and economic equilibrium between productive capacity and consumption was in the last analysis accomplished by the self-adjusting mechanism of the price system. Its almost silent, almost unobserved forces reduced the rate of profits, decreased prices, increased real wages, and created greater consuming power among the masses of people in Great Britain as well as in the rest of the western European world.

There were, however, great drawbacks to reliance upon processes so little understood, so uncontrolled. In the first place, the adjustment arrived at by these means was never complete or permanent. A new invention in one industry was always apt to increase output, throw men out of work, and render older plants obsolete at the moment when in another industry conditions seemed to be becoming relatively satisfactory. In the second place the equation between demand and production through the operation of changes in prices, profits, and wages was too slow for the impatience of those who suffered and too mechanistic for those who felt. The assurance that in some future people would be able to buy all that could be made and grown had no comfort for an iron puddler whose trade was gone and who, too old to learn a new craft, would never be employed again except in casual work. Even those who believed that things would be better for themselves next month had to eat today. This feeling led to the rise of a number of groups who intended to better things more quickly by social planning. At the basis of all such work was the idea of the use of the state as an effective agent in social and economic control.

There has been in evidence among the people of Great Britain and other European countries, during the eighteenth and nineteenth centuries, an extraordinary regard for human welfare. In its present form this feeling seems to go back to a mystical religious revival of the late seventeenth and early eighteenth century known as pietism on the continent, and evangelicalism in England. The fatherhood of God had meaning only in so far as it was realized in the brotherhood of man. Pietists and evangelicals, cutting through the formalism into which religion had fallen, emphasized the service of mankind as the proper worship of God and exemplified their faith during the eighteenth century in the building of orphanages and hospitals, the reform of the prisons,

the conversion of the heathen by foreign missionary enterprise, and the launching of the anti-slavery campaign throughout the world. In the more or less secular nineteenth century the pietistic impulse remained most powerful. By some it was stripped of its religious premises and given a purely secular guise in such movements as utilitarianism, positivism, and socialism. The zeal for humanity was no whit abated, perhaps even intensified, as it became the sole God which the scientific conscience allowed itself to consider. In whatever fashion men of sentiment approached the cause of human well-being they were outraged by the contrast between the wretchedness of the unemployed and the misery of the poor in general on one side and the growing wealth of society on the other. They could not sit still while things slowly worked themselves out. They felt that thought, motivated planning, and intelligence, in which they had the greatest faith, could not only hurry things up but could raise the whole state of mankind to higher levels than could ever be reached merely by letting things take their course. Such views had been expressed all through the nineteenth century by those whom, for want of a better name, we may collectively call social reformers. The economic situation of the last quarter led to many interesting suggestions on their part.

We need not be concerned here with the eschatology of the various groups in the movement. The socialists, for example, proposed the socialization of capital, the cooperation of labor, and the equal division of wealth as their final goal; but this materialistic end, their heaven, was, no less than the Paradise of the Middle Ages, intended chiefly to keep the rank and file quiet during the present discontents. On the practical side the lead was given by the realistic economists who assumed that the fundamental difficulty in the social set-up of their time lay in the faulty distribution of the national income. They likened the annual production of wealth in factories, mines, and farms to a stream which was divided into three branches, the first going to the capitalists, promoters, managers, and technicians in dividends and salaries, the second going to the state in taxes, and the third to the masses of workers in wages. Because the volume of wealth going to the comparatively small number of capitalists, promoters, managers, and technicians was disproportionately large, the flow available for the masses was much restricted. The capitalist

classes, moreover, could not possibly consume all that came to them. The unconsumed goods which they commanded but could not use acted as a dam and backed up the stream of production until in some cases the very sources of production were choked up. The remedy clearly lay in the diversion^o of the unused excess from the capitalists to the masses who could and would make use of it. Thus the stream of production would be allowed to run free and clear, with work and well-being for all.

As a matter of fact, the reduction of profits and the rise of real wages were actually accomplishing this very diversion. But the planned acceleration of the movement of prices and wages was so complicated a matter that thinkers considered it an impossible task and turned to another solution. This envisaged the use of the physical power of society in its corporate capacity, in the form of action by the state, to set right things that were amiss.

Even in England, where in 1870 men held that the only proper functions of the state were the defense of the country, the maintenance of internal peace, and the enforcement of contracts, Joseph Chamberlain and his radical followers were declaring in 1885 that "political influence is the chief . . . instrument by which any large amelioration of unfavorable circumstances and any extensive improvement in the condition of the masses of the population can possibly be secured." In his view, "the community may, ay, and ought to provide for all its members benefits which it is impossible for individuals to provide by their solitary and separate efforts." One of Chamberlain's friends declared that the state was the nation in its collective and corporate character, "the sovereign agent for all moral, material, and social reforms." The method to be used by the state in achieving the purposes desired was the seizure of the excess of the rich through heavy taxation or forced contribution to special funds under state supervision and its transfer to the poor in the form of social benefits and services.

The State as the Agent for Social Reform

Government budgets well down into the nineteenth century were comparatively small. The acquisition by the state from the rich of a share of the national income each year sufficient to effect relief to the dammed-up stream of production entailed a revo-

lution in finance, with the invention of new varieties of taxes and the handling by the government of sums beyond imagination large as compared with the past. The administration of complicated forms of benefits and services required the creation of a bureaucracy of technical experts whose duties were so involved that neither politicians nor the people could understand what they were doing.

As these programs of state ordering of social life were adopted, the governments of Europe became associations of experts, highly trained, conscientious, and anonymous. The very nature of their duties made their tenures permanent, and the complexity of their departments resulted in the almost necessary adoption of their recommendations. The old line politicians were transformed into intermediaries between the expert bureaucrats and the people, explaining to the people what the bureaucratic expert wanted and inducing the people to vote the necessary taxes to carry out a program. In England alone, to give but one example of the growth of bureaucracy, in 1900 there were 30,000 civil service employees in government service (exclusive of the post office workers); in 1935 there were 115,000. In 1900 these civil servants controlled the expenditure of £23,000,000 out of a total normal national expenditure of less than £100,000,000. In 1935 they controlled the expenditure of nearly half of a total disbursement of £800,000,000 annually. The major portion of all other expenditures was earmarked for the service of the public debt or for the army and navy, leaving to Parliament a free hand in the expenditure of only small sums. At the very moment that Great Britain and other nations of Europe became more democratic through the extension of the franchise, the electorate ceased to have very much to do with the actual control of the government. Under the new paternalism, the expert recommended, the politicians approved, and the people paid. The individual was less free and materially better looked after than at any time in past history. Curiously enough, the older impulse to political democracy in the form of the extension of the franchise lived on. Voting rights were claimed and won by classes and individuals hitherto excluded from the suffrage. Even women began to be interested in the right to vote. Fundamentally the further extension of the franchise was of great significance because the voting masses steadily increased the pressure on the politicians

for more of the same, and the politicians either had to get it for their clients or lose their places.

Those services and benefits most discussed by the reformers of the time were the provision of better housing for the poor to relieve overcrowding, to check bad sanitary and health conditions, and to reduce mortality rates; the provision of medical care and financial assistance in the case of illness and industrial accidents; the assurance of security in old age; the extension of educational advantages; the care of widows and orphans; the opening of labor exchanges to bring workers into contact with jobs; and the creation of devices to provide for the workers and their families during periods of unemployment.

The most significant program of practical measures to realize certain of these objectives was that introduced in Germany during the 1880's and 1890's. Though Great Britain was behind her continental neighbor in actual legislation, there was much attention to the problem. English politicians, led by Joseph Chamberlain among the Liberals and by Lord Randolph Churchill among the Conservatives, had begun to insist upon the obligation of the state to undertake the work of social reform. They were unsuccessful, however, in breaking down the laissez-faire sentiments among their colleagues and fellow subjects or to bring about any very widespread acceptance of their views. The British people still had a profound distrust for mere intellectuality. When the intellectual approach failed, it was requisite, as so often before in English history, to fall back upon the emotional appeal to the feelings and the consciences of the British people. Ample material of the sort calculated to do so was immediately forthcoming. In 1883 William Reaney published his *Bitter Cry of Outcast London*, a terrible picture of life among the poor of the capital. A little later Charles Booth, a great shipowner, began his investigation of the actual earnings and expenditures and the conditions of life among the various classes of London people. In his six volumes of *The Life and Labour of the People* he showed, as a result of his careful street-to-street and house-to-house inquiries, that it was reasonably sure that one-third of the people were on or about the line of poverty or were below it, having at most a weekly income which averaged 21 shillings or 22 shillings (\$5.10 or \$5.34) for a small family, or up to 25 shillings or 26 shillings (\$6.06 or \$6.30) for one of larger size, and in many cases

falling below this level. There was perhaps another third of the people of London who had about 10 shillings more a week or taking the year round, from 25 shillings to 35 shillings a week, among whom would be counted in addition to wage earners many retail tradesmen and small masters. The last third would include all who were better off. The first group were, practically, those who were living two or more persons to each room occupied. The next had on the average nearly one room to each person, and the final group included those who employed servants as well as some who did not. Of the first many were pinched by want and all lived in poverty, if poverty were defined as having no surplus. The second enjoyed solid working-class comfort, and of the third group the worst off lived in plenty and the best in luxury.

A whole series of other studies substantiated the fact that the conditions found in London were repeated in every part of England. Mark Pattison, one of the greatest Oxford scholars of his time, put the matter very succinctly when he declared that the greatest fact in contemporary history was the circumstance that five million "of our population" possess nothing but their weekly wages.

The cumulative effect of the studies of the time was to prove that this England, this other Eden, demi-paradise, was in reality a purgatory for countless thousands and a real hell for the worst-off elements in the population. No wonder that Frederic Harrison cried out that if this state of things was to be the permanent arrangement of modern society, civilization must be held to have brought a curse to the majority of mankind. Ninety per cent of the actual producers of wealth had no home which they could call their own beyond the end of the week, had no bit of soil or so much as a room that belonged to them, had nothing of value of any kind except so much old furniture as would go into a cart, had the precarious chance of weekly wages which barely sufficed to keep them in health, were housed for the most part in places that no well-to-do man would think fit for his horse, were separated by so narrow a margin from destitution that a month of bad trade, sickness, or unexpected loss brought them face to face with pauperism. Life in cities seemed to be growing more monotonous; in the country, less healthful and cheerful for the masses. Below the average workman was ranged at least a tenth of the whole population, the submerged tenth, whose normal

condition was one of sickening wretchedness. This destitute residuum was, if relatively diminishing, positively increasing in numbers, and was in a state of appalling barbarism. The general improvement was of so moderate a kind and was accompanied by evils so menacing to society that the future of civilization itself was at stake.

The modern student will recognize here the passion of the evangelist endeavoring to strike fire from the flinty hearts of contemporary England. Nor was this sort of appeal unsuccessful. Under its spur, stimulated perhaps by riots in London and great strikes among the dispossessed during the years from 1886 to 1889, Englishmen accepted the obligation to do something about it. They ended by adopting a most complete program of social reform measures, but their first steps were definitely halting. Legislation comprised a housing act in 1890, a free education act in 1891 abolishing fees in the people's schools, a small holdings and allotments act in 1892, a factory act in 1895 fixing the hours of work for children at 30 and of young persons and women at 60 hours per week (!), and an employers' liability act in 1897, rendering the employer liable for injuries to his workmen, provided they had not signed a special contract with him disallowing his responsibility.

Many of these acts were in reality but pious intentions, with no real effect on the social problem. At the beginning of the new century figures revealed that even in "good times" it was probable that there were in the English towns of over 15,000 inhabitants no less than 5,000,000 persons in a state of more or less acute poverty. Nor could any hope be discovered that things were getting better. Fortunately, at the turn of the century the old men in both parties who had so long prevented political action yielded to younger groups. Salisbury, head of the Conservatives, retired in 1902; Gladstone, the chief exponent of the laissez-faire state, died in 1898. While Salisbury's immediate successor, his nephew Mr. A. J. Balfour, could give no positive leadership to the Conservatives because on his map every road came back to the starting place, Mr. Joseph Chamberlain, now high in Conservative councils, proposed a great social and economic advance by way of a high tariff and imperial preference. The Liberals countered with a program of thorough amelioration of the most pressing evils. The appearance in 1901 of a new political party

did much to precipitate action. The new party was compounded of trade unionist workers and the intellectual socialists who, through the Fabian Society, the Independent Labour Party and the Social Democratic Federation, had done much to work out programs of social reform.

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Chapter 28

THE AUTOMATIC MACHINE, SCIENTIFIC ADVANCE, SURPLUS CAPITAL, AND PROLETARIAN DEMOCRACY, 1900-1914

General Considerations

As THE nineteenth century drew toward its close contemporaries looking back over its achievements found them good. With a complacency, which was to some extent at least deserved, men spoke of the "century of hope," "the wonderful century," in which greater "progress" had been made than in any similar period in the history of the world.

Indeed, if we take the most basic of all tests of progress, the number of the people and their increase during the nineteenth century, it was incomparably the greatest epoch in all history. The population of the world was, by estimate, 630,000,000 people in 1800. By 1900 it reached 1,550,000,000. Every continent shared in this remarkable growth, though America had a relatively larger share, and Africa and Australasia, a smaller one. Europe increased her numbers from 175,000,000 to 410,000,000; America, from 10,000,000 to 170,000,000; Asia from 365,000,000 to 817,000,000; Africa, from 75,000,000 to 130,000,000; and Australasia, from 5,000,000 to 8,000,000. The population of England increased from 9,000,000 to 40,000,000 people. The increases in America and Europe are easily referable to colonization and to the progress of industrialization. Yet, since the process was so generally at work throughout the world, European and American circumstances cannot be considered as affording a complete explanation of a phenomenon that was in evidence everywhere.

At the same time there were certain European factors which had worldwide significance. In the first place, the general quickening of economic activity in Europe and the United States reacted directly on Asia, Africa, and Australia to stimulate the productivity of their people, create greater economic wealth among them and raise their general standards of comfort and well-being. Wherever European nations appeared as colonial powers they ended local civil wars, tribal barbarities, and individual crime; they introduced sanitary regulations on European models, checking age-old scourges such as cholera and the bubonic plague; and they made European medical knowledge available to natives in remote jungles. The world at large reaped the benefits of the enormous advances in medical science which were made in the second half of the nineteenth century in the laboratories and hospitals of Great Britain, France, the United States, Austria, and Germany, just as it profited by the better markets for raw materials, the cheaper manufactured products, and the better facilities for transportation and communication brought into existence by the industrialization of Europe and America.

Yet while there is something magnificent about nineteenth-century progress and the American and European contributions thereto, there was a good deal of naïveté, even self-satisfaction, about the way in which the men of the nineteenth century regarded their achievements. The attitude of the physical scientists is typical. So stupendous were the advances in knowledge that they fondly believed, in the early 1890's, that nothing remained for the future except the closer measurement of the physical constants, represented by the addition of a decimal place or two to the figures for the ohm or ampere, and the completion of certain investigations which seemed to promise the solution of the problem of the structure of matter in terms of the luminiferous ether. And yet in 1895, when Wilhelm Konrad Roentgen announced the discovery of X rays, an entirely new development in physics was begun. Through the study of various kinds of rays thus initiated new concepts of the structure of the atom were evolved, radioactivity was discovered and investigated, the atomic numbers of all possible elements were worked out, the quantum theory, that the radiation of energy from a substance is discontinuous and involves a unit amount of energy called the quantum which

varies with the vibration frequency, was advanced, and matter was reduced to a disembodied wave system best described by an obscure mathematical formula.

Twentieth-Century Medicine

The achievements of men working in the physical sciences were of such a nature that they could be applied to industrial development. In the biological sciences, especially in medicine, progress contributed directly to the extension of human life. As a result, although the birthrate fell in the 1880's, the population continued to increase because of the constantly reduced death rate. The physicians of the nineteenth century had brought anatomy and physiology to a high point. In the twentieth century the greatest advances in medical science were in the fields of the development of vaccines and toxin-antitoxins for the treatment of bacterial diseases, the development of chemical specifics for special bacteria, and the control of the spread of infectious diseases by insects.

Transportation and Communication

Analogous to the revolutionary changes in the physical and medical sciences in the early twentieth century which swept by the board the Newtonian physics and the classical mechanics and introduced the whole field of bacterial medicine, were the advances in the world's economic life. Developments were so rapid and on so extensive a scale that the achievements of the nineteenth century, great as they were, seem dwarfed. Great Britain lost her leadership among industrial nations to Germany, and the United States soon outstripped both. Japan, industrialized by the frank imitation of Western models, became one of the great powers. In agriculture, commerce, and industry there was a remarkable intensification of activity. For this many causes may be assigned. Technological experience and knowledge, gathering acceleration from past progress, advanced even more rapidly than during the great period of the 1870's and 1880's. The practical genius of America and a great outburst of scientific investigation came to fullest fruition in the last decade of the nineteenth and the early years of the twentieth century. Capital accumulations,

reaching greater aggregates than were known in the past, were eagerly reinvested in new plants and facilities to effect increased production. Advanced technology and abundant capital were applied in greater measure than before to the development of communication and transportation. One of the characteristic features was an extension of railway building to all parts of the world. Asia and Africa rang with the clang of navvies' hammers as they drove in the spikes along the lines of shining steel which were to carry modern trains through areas which had hitherto not known anything faster than the camel caravan. The major Chinese railways were begun during the 1890's. The Trans-Siberian line, begun in 1891, was pushed during the next twenty years across Siberia from Sverdlovsk to Vladivostock, a distance of 4350 miles, at a cost of 500,000,000 rubles. Cecil Rhodes epitomized his dream of Anglo-African empire in the Cape-to-Cairo railroad, large sections of which have been built.

Africa, Asia, Australia, and South America were beginning to be overlaid with networks of rails which had the same effect in stimulating the life of anciently settled areas as was witnessed when the railroads of Europe and the United States were built during the nineteenth century.

During the first decade of the new century experimentation with the automobile continued; by 1910 it was becoming a prime element in transportation in England, France, Germany, and the United States.

The light gasoline motor, with as little as one pound of weight for every horsepower developed, made possible not only the automobile but the airplane. During the 1890's Otto Lilienthal and Samuel P. Langley were experimenting with gliders and model aircraft, but Langley was unable to build a practical machine largely because of the insufficient power of his motor. On December 17, 1903, the Wright brothers, at Kitty Hawk, North Carolina, accomplished the first flight in a motor-driven, heavier-than-air machine. Their initial flight lasted 12 seconds, but two years later they flew $24\frac{1}{2}$ miles in half an hour. By 1909 the airplane was so far perfected that L. Bleriot flew across the English Channel, from Calais to Dover, in 31 minutes. The economic effects of the airplane were not significant, however, until after the first World War.

Meanwhile progress in ocean transport was, if anything, even

more rapid than that on land. The construction of the Panama Canal by the United States government (1904-1914) after French failures during the 1880's and 1890's enabled a ship to go from the Atlantic to the Pacific in seven or eight hours and actually brought into existence the passage for which so many explorers had searched during the sixteenth and seventeenth centuries.

The triumph of the steamship over the sailing ship was well recognized before the twentieth century began. The great advance during the twentieth century was in the efficiency of the engines of the steamers, in the size of the individual ships, and in the total tonnage afloat available for the world's commerce.

The tonnage of ships in the British registry increased from 9,300,000 to 11,500,000 tons between 1900 and 1910. The first ship to exceed 10,000 tons, apart from the abortive *Great Eastern* of the 1850's, was the *City of Paris*, built in 1888. In 1899 the *Oceanic* passed the 15,000-ton mark, in 1901 the *Celtic* went above 20,000 tons, and in 1907 the *Lusitania* and *Mauretania* topped 30,000 tons. The *Vaterland* and the *Imperator*, put into service in 1913 and 1914, exceeded 50,000 tons. Cargo ships also tended to increase in size from a norm of perhaps 2000 tons in 1890 to 6000 or 8000 tons in 1910. In the newer ships notable improvements were embodied in gear and engines, such as the new turbines of Parsons and Diesel's internal combustion motor.

As in the case of transportation, so in communication the early twentieth century witnessed an extension of the developments already under way during the later years of the nineteenth century. Mail service was improved, the telegraph and cable lines of the world were extended, and the telephone came into common use in business houses, and even in private homes. There was, however, one extraordinary innovation. In 1896 Signor G. Marconi, giving practical form to certain theoretical knowledge regarding electro-magnetic waves discovered by Heinrich R. Hertz, succeeded in sending electric signals without wires. Five years later he made the attempt to send his signals across the Atlantic. On December 12, 1901, Marconi, at his receiving station at St. John's, Newfoundland, repeatedly heard the letter "S" at the times he had arranged for it to be sent from his transmission station at Poldhu in Cornwall. Wireless telegraphy was a fact, and presently was found to be of great service to ships at sea. In 1904 J. A. Fleming invented a vacuum tube, improved in

1906 by Lee De Forest, which made wireless telephony a possibility. It was not commercially important, however, until after 1918.

The More Extensive Use of Electricity

The electric dynamo and the electric motor were invented in the 1870's, and before 1900 electricity had been used both for light and power in constantly growing amounts. After 1900 great activity developed in the construction of giant steam turbine generating stations and in the harnessing of waterfalls to hydroturbines for the generation of electricity. As electric power became cheaper and more generally available there were those who predicted that steam engines in factories would be replaced by electric motors attached directly to the machines. Electric light came into more common use also, not only for street lighting and in stores, office buildings and factories, but also in private homes.

New Products

Another important aspect of the economic development of the early twentieth century was the continued application of scientific research, especially in the field of chemistry and physics, to the problems of industrial production. The result was the creation of a number of synthetic products, that is, products made artificially in the laboratory or factory, to supply the need for similar products whose appearance in nature was limited. Extraordinary things had already been accomplished before 1900 in the chemical study of coal tar and its derivatives, and progress in this field was continued. Applied to the metals, chemistry indicated the possibilities of certain alloys. Small additions of rare earths, such as molybdenum, vanadium, or chromium, for example, were found to give to steel certain qualities such as toughness or hardness at high temperatures. Steel alloyed with tungsten could be used for cutting-tools without loss of effective edge in machines run at such high speeds that the tools became white-hot.

Chemists and physicists did much experimentation in the field of the production of artificial textile fibers, and early in the twen-

tieth century rayon was being manufactured on a commercial scale. The most extraordinary achievement of science was the fixation of the nitrogen of the air, so as to make it available for use, in the form of a nitrate, as fertilizer. One method was worked out by Fritz Haber of Berlin, who produced synthetic ammonia by combining nitrogen and hydrogen in the presence of a catalyst under 200 atmospheres of pressure at a temperature of 500° C. In 1913 immense factories were built in Germany to exploit this process, which promised to make the world independent in the future of natural deposits of nitrate fertilizers.

The Machine Tools and the Assembly Line

While in the factors so far discussed there have been some significant innovations, as for example in the invention of wireless telegraphy and the fixation of nitrogen, for the most part the developments in transportation and communication and in the application of science to industry represent continuations of development along lines already entered upon during the nineteenth century. A more revolutionary feature of the developing economic life of the first decade of the twentieth century was the introduction, in the manufacture of machinery itself, of the machine tool and the assembly line. In the early days of the manufacture of the machinery upon which so much of the output of modern industry depends, it was made by hand, its parts subject to the process of fitting and filing until they went together. Great accuracy in the manufacture by machinery of machine parts was made possible by the invention, chiefly in the United States, of four machine tools, the milling machine, the turret lathe, the automatic lathe, and the grinding machine. These could be set to do their work according to a die or pattern, while micrometer gauges, which would measure to 1/100,000 of an inch, reduced the tolerances of error to the minimum. Once the original dies and gauges were set, interchangeable parts could be turned out with perfect accuracy without human interference on these machine tools. These parts, carried along on conveyor belts to a main assembly line, were then fitted together into machines of greater precision than could be made by hand. Typewriters, bicycles, locomotives, automobiles, dynamos, looms, clocks, harvesters, printing presses, cash registers, spinning ma-

chines, and engines could be made by the automatic machine tools with a precision which reduced wear and improved the product of the machine itself. The machine turned out by the automatic process could be more involved and complicated than before, so that eventually it often became virtually automatic itself. The printing press in commercial work, for example, at the end of the nineteenth century needed the services of at least two men to run it, one of whom fed the paper sheets one by one, 8000 a day, into the machine. In 1899 the first automatic press-feeding attachments appeared, and after 1913 their introduction was very rapid. The worker known as the press feeder disappeared, and through other improvements in the operation of the presses the printer or pressman himself had nothing to do but watch the press, once he had put it in order and set it going. For a long time, however, in this particular industry, expansion was so rapid that the displaced press feeders found employment in other capacities. The skilled pressman, moreover, even though he did nothing while the press was running, found himself called upon for a higher degree of skill than before in preparing the press for a job and in keeping it in good running order.

In Great Britain the acceptance of the automatic tools and the assembly line was slower than in the United States, and the full economic effects of this development were not felt until after 1914.

Increasing Industrialization of the Population

At the same time that machinery tended to become more automatic and capable of turning out a greater quantity of products, the number of persons engaged in industry or in subsidiary employments increased considerably. The growth represents in part a curious shift in social habits, in part a new emphasis upon business administration and the elaboration of distribution in department stores and shops, and in part a realignment of age groups among the employed. Lower-class women had taken their places in the factory early in the nineteenth century; but down to the 1890's the middle-class woman's place was the home. Such a view did not preclude her from helping in the fields if her husband were a farmer or participating in tending the shop if her husband were an independent artisan or a small tradesman. The

frequent bearing of children filled up the interstices of time not occupied by her other duties. The rapid spread of contraceptive knowledge after the middle 1870's gave her freedom from continual confinements; the absorption of industry by the factory and of trade by the large store took away such economic functions as she could exercise in her own home in partnership with her husband.

The recouping of the economic losses entailed by the disappearance of participation in the husband's work as well as escape from ennui and boredom was offered by employment in "business." Young women learned the operation of that tricky little machine, the typewriter, and proceeded to make their services indispensable to modern industry as office workers and secretaries. Other young women, less gifted, took their places at the machines beside their lower-class sisters, and many sought refuge in those rising emporia of trade, the specialty shops and the department stores. On the basis of the economic independence thus achieved by women's earning their own living there grew up the whole modern feminist movement.

The entry of women into business life accounts for only some of the relatively increased numbers of wage earners. A second source is to be found in the fact that the life expectancy of workers was lengthened and the working life of individuals in industry was longer than in the past. It has been calculated that the normal expectation of life in England for males increased from 39.9 years in 1854 to 55.6 years in 1922. There were analogous extensions in other countries. There was a far higher proportion of older people among the population, a fact accentuated by the tendency to late marriages and smaller families; and those who reached middle life had the probability of living longer than people of the same age group had had in the middle of the nineteenth century. The whole development represents, of course, the cumulative effect of the improvements in standards of living and of the control of disease through constantly advancing medical knowledge. Not only was the world of business and industry in the early twentieth century tending to become a bisexual world, but it was also tending to become an older people's world.

While it is impossible to make any generalization about the effect of the new type of industrial techniques upon the workers in individual cases, some observations of the total effect are pos-

sible. The output of industrial plants increased very greatly. The rate was particularly rapid between 1904 and 1909. The statistics available for Great Britain indicate that the total value of all manufacturing, mining, and building for the year 1911 was £688,000,000 (\$3,440,000,000).

Problems of Industrial Organization

Perhaps the most characteristic feature of the industrial organization of the decade was the continued formation of large-scale corporations, trusts, and cartels. These were of two kinds, the vertical combinations which controlled all processes from the production of raw materials to the manufacture of the finished product, and the horizontal trusts, which monopolized a single process. Among the first type of organization were the Lever Soap Combine, the Inveresk Paper Company, and the Vickers and John Brown Company engaged in ship, gun, heavy machinery, and armament manufacture. The J. and P. Coats Company, which made cotton thread for the empire and a good part of the rest of the world, was a horizontal trust. The size of some of the resulting business set-ups, such as the Imperial Tobacco Company, was so great that among common folk the age-old fear of monopoly revived in the strongest fashion.

A committee on trusts which reported in 1919 found ninety-three associations of monopolistic character in Great Britain, which were in danger of exercising a paramount control over all important branches of British trade at no far distant date. These trusts were closely connected with great banking groups and served as one means by which the control over industry by financiers was intensified.

The Problem of Selling What the Factories Made

While the trusts had many advantages as well as grave defects, perhaps the chief count in the popular detestation of their activities was the fact that they served to keep up prices. In this way the trusts, together with the great corporations, were tied up with the whole problem of disposing of the products of industry and the relation of this matter to prices, wages, and the recurrence of depressions. In the case of Great Britain, although the total wages

rose, there was a tendency for salaries and profits to rise almost as fast as the increase in the wages bill. Thus the relatively small number of persons, represented by capitalists, manufacturers, technicians, and the members of the professional and trading middle classes continued to receive a disproportionately large part of the wealth created each year, while the overwhelmingly larger masses of the wage earners, whether engaged in industrial or commercial pursuits, whether working in factories, offices, stores, or homes, received an absolutely larger but not a significantly larger share. While many individual farmers were wealthy or well-to-do, farmers on the whole tended to gravitate toward the workers in regard to their incomes.

Prices and Wages

The rise of new industries to create and satisfy new wants, as was the case with the automobile industry, and the augmented employment in stores and offices did much, but not enough, to create the earning power necessary to absorb the product which industry was capable of turning out. The predicament in which the world found itself was intensified by a very significant shift in prices. During the early 1890's monetary values continued to rise, on a curve of decreasing prices which had begun in 1873. This matter of falling prices was generally believed to be the result of the growing shortage of gold and the refusal of the governments of the world to recognize silver as part of their monetary system. Declining prices were particularly hard on the debtor classes, who had borrowed money when prices were higher and now had to repay when it took more bushels of wheat or more yards of cloth to secure the money with which to make repayment. During the later 1890's cheaper money was provided by the discovery and exploration of the Klondike gold fields. Beginning in about 1896, prices of commodities rose all over the world so that money had approximately 10 per cent less value in 1910 than it had in 1900.

At the same time wages for the same kind of work, after considerable increases which came in the 1860's and early 1870's and were resumed during the later 1880's and early 1890's, remained rather stationary after 1900. The result was that workers could

actually buy less with the same money wages in 1910 than they had been able to buy in 1900.

Markets abroad, distribution of part of the industrial surplus in social services, and consumption in state services such as the army and the navy were the only recognized alternatives to shutting down plants. One other way out might have been through the steady reduction of prices of manufactured goods to stimulate their purchase. Indeed, in the United States Henry Ford adopted this policy, and by it he made the famous Model T Ford car, introduced in 1909, the "universal car," with a market unparalleled in the history of the world. Yet generally speaking there was a curious social lag between the production of new kinds of goods and rises in living standards. The public was not eager enough to buy the products which factories made, and their latent desires had to be stimulated by expensive advertising and sales campaigns. The additional overhead thus created by the costs of selling prevented price reductions, if profits and dividends were to be maintained. Such was the vicious circle created by the fact that the prolificacy of the automatic machines compelled goods to look for customers. Their owners could not wait for customers to look for them.

Programs of Social Reform

At first appearance so solid and stable, the world of the early twentieth century was shot through with defects and flaws. The specter of insecurity which has bedeviled the life of human beings for so many centuries still hovered over the world, in spite of the fact, which even uneducated men could recognize, that machine industry was now providing a material basis for genuine security for all, provided that the necessary adjustments could be made. It was widely assumed that such adjustments were completely outside the range of individual activity and must be made by national governments. On the one side were great capitalist industries able to turn out more than could be sold, able to pay their overhead and necessary dividends only if they could be kept going full tilt. On the other side were masses of proletarian workers absolutely dependent on full-time work, in constant danger of being supplanted by machinery, faced by rising prices and fixed wages, harassed by the fear of sickness, layoff, unemployment, and old

age. Literate, they were nevertheless too ignorant to understand the economic forces in which they, like Laocoön, were caught up. They could and did understand, however, that in the immediate past their class had gained much through the progress of political democracy, and they therefore put their first trust in still further advances in political rights. In Great Britain this took the form of a demand for the extension of the franchise to women, which was won in legislation of 1918 and 1928.

The fact is that the problems of the control of modern industry and of the readjustments necessary to lay the great fear of insecurity were too complex to be solved by parliaments of five or six hundred lawyers, gentlemen, and business leaders talking endlessly about matters which they did not understand. The only possibility of a fundamental solution of the problems which faced mankind lay in the reasoned conclusions, based on intensive investigation and research, of highly trained students of social and economic relationships. When such men entered government bureaus as permanent civil service employees their suggestions were readily made the basis for government policy. The rise of the technical expert in public problems had an immediate effect upon the whole business of politics. The great politician was no longer the source of political ideas (if he ever was); he became the exponent of the conclusions of the experts. He was the man who could grasp programs evolved by men of greater insight, who could explain to the mob in words of one syllable complicated social programs which he did not always fully comprehend and who could, through his control of Parliament, induce the representatives of the people to vote money, through taxes on the people, to pay for the projects which the anonymous experts had decided would be for the people's good.

While the proletarian masses saw in democracy the philosophers' stone which would turn all things to gold, they early made it evident that they had no intention of waiting too long for the realization of their dreams. They entered actively into politics and literally forced the existing political leaders to take immediate action. In what was done there was a curious absence of novelty or even appropriateness. There were available ready to hand the elaborate programs of social and economic readjustment which had been worked out from the 1870's and 1880's onward, and, in the absence of any new ideas of their own on the subject, the po-

litical leaders of the early twentieth century seized upon these old programs and enacted them into law. The appearance of the British Labour Party in 1901 forced the hand of the politicians of both the old parties. The Liberal Party, which came into office in 1905, carried the election of 1906 by promising an elaborate program of social reform legislation.

The program as actually worked out in England is, on its practical side, a curious compound of many ideas. The enactments owe their final shape in part to the fact that they were forged under the double stress of intellectual conviction and emotional excitation. The spread of epidemics from festering slums had created, long since, an interest in sanitation and housing reform. There was a direct connection between overcrowding and mortality rates. The seriousness of the situation is illustrated by census figures. In one area in London the mortality figures for people living two to a room were 32 to 39 per thousand; among those occupying four-room houses, 6 per thousand. The census of 1901 described as overcrowded 392,000 tenements in which lived 2,667,000 persons or 8 per cent of the whole population. In London two-thirds of the population lived in dwellings of not more than four rooms; in Glasgow one-fifth lived in one-room dwellings and one-half had houses of not more than two rooms. Advances in solving the problem of housing the poor in sanitary and commodious quarters must come, it was felt, largely through securing better supervision of building and through the reduction of the rents of decent houses by forcing the monopolist land-owners to reduce ground rents for the sites on which houses were built. If unoccupied building land were brought into the market the rental value of the rest would be reduced. Since landlords purposefully withheld site land to keep up rents, it was argued that the owners could be forced, by special taxes on land as long as it was not built on, to throw it into the market for building purposes.

It was generally agreed, further, that wages must be raised and conditions of employment stabilized. The failure of wages to rise more rapidly than they did was attributed to the constant oversupply of labor in the towns brought into existence by the migration of country workers to the cities. If the young men and women among the agricultural laboring classes could be kept in the country, the laborers in the town, no longer exposed to the

competition of the surplus laborers with each other, could increase their wages through the operation of the law of limited supply. Agricultural workers were believed to be eager to go to the cities because they had no access to the land, no chance of becoming independent farmers themselves. The best way of keeping them in the country was by making it possible for them to get little farms of their own, small holdings or allotments, through which they might be able to rise in the social scale and attain some dignity and independence. To overcome the attractions of the bright lights of the cities still further, traveling circuses, lectures, and other recreational facilities in the country were suggested.

The stoppage of the migration of the country laborers and their emergence as small holders would have a second, and not unimportant, result. Town life was believed to be sapping the vitality and destroying the physique of the masses, and there was a good deal of concern for the character of future armies, drawn from slum-bred sources. Small holdings and allotments would provide England with a sturdy healthy peasantry able to keep up the high standard of the country's military forces.

Sickness and accidents were known to be responsible for a considerable portion, fixed by Lloyd George at one-third, of all poverty. Losses of wages and expenses due to accidents were fairly chargeable against industry. Unemployment must as far as possible be ended and, where it could not be prevented, must be relieved at the cost of society. Old age, finally, must be provided for, so that those hundreds of thousands who had served faithfully in the army of industry during a long life might not be left to eke out their closing years in wretchedness and misery.

Between 1906 and 1914 the Liberal Party, led by Sir Henry Campbell-Bannerman, H. H. Asquith, and David Lloyd George, carried through its program. The fiscal difficulties inherent in commitments for large expenditures for social services were increased by the necessity, if England was to maintain her maritime supremacy, of heavy disbursements for the construction of a series of new type battleships known as dreadnaughts.

The double demand for more money was met by a series of revolutionary budgets. In them were developed the principles of graduated and progressive taxation on inheritances, and they distinguished between "earned" and "unearned" income with high rates on earned income, subject to only £160 (\$800) exemption,

higher rates on unearned income (coming from investments), and super-taxes on incomes over £5,000. New taxes were laid on the land, machinery, mineral rights, motor cars (one pound per horsepower), and gasoline. In the course of a few years the income of the state was increased from £100,000,000 a year, the figure for 1908, to £200,000,000 a year, the figure for 1913.

The social legislation of the Liberals covered various aspects of the social problem as understood by the Liberal leaders. Better housing for the masses was the aim of a site tax, provided for in the budget of 1909, of one-half penny in the pound of the annual value of the land not built on. Municipal participation in and public control of all building projects, to prevent the emergence of new slum areas, was authorized in the Housing and Town Planning Act of 1909. Unfortunately both departures were not very productive of results, and the British housing situation was worse in 1920 than it had been in 1910 or 1900. After the war, when there was a shortage of perhaps a million houses, new measures had to be taken in hand.

The ordinary workingman was aided in many different ways. A small holdings and allotments act was passed in 1907. In the budget of 1909, to force the great landlords to break up their estates that land might be available for small holdings, a special unearned increment tax was introduced. To bring workers into contact with jobs and to assist them in going to a job in a distant part of the country, employment offices or Labor Exchanges, supported by the government, were opened all over Great Britain. To relieve the terrors of unemployment when it could not be avoided, an unemployment insurance scheme was put under way in the National Insurance Act of 1911. Though this was at first limited to workers in the building and engineering trades, the purpose was to extend it to other workers as soon as sufficient actuarial data were obtained. Under the original act the worker and his employer each contributed two and one-half pence a week and the state added one and two-thirds pence to an insurance fund, from which in the event of unemployment a man might draw seven shillings a week for 15 weeks. Sickness insurance was likewise provided for in the National Insurance Act of 1911. All employed persons earning less than £160 a year were required to insure themselves against sickness. The individual paid a premium of 4 pence a week, his employer, 3 pence a week, and the

state 2 pence a week. In the event of illness the insured person was entitled to a sickness benefit of 10 shillings a week if a man and 7 shillings 5 pence if a woman for 26 weeks, and 5 shillings a week thereafter. He received free medical attendance and free medicine, and sanitarium care under certain circumstances. Insured women received a maternity benefit of 30 shillings. If their husbands were also insured, the benefit was 60 shillings. When a woman or a man reached the age of 70, he or she was entitled under the Old Age Pension Act of 1908 to a pension of 5 shillings a week, with certain provisions.

Special attention was paid by the Liberals to the lowest grade of workers, those known as "sweated" workers, and to the children whose well-being was the hope of the future. For sweated workers trade boards were set up with power to fix minimum wages. For the children there were acts extending medical care and instruction to women during pregnancy and after childbirth, acts establishing play centers and kindergartens, acts providing for free medical inspection in school, and an act extending the school-leaving age to 14, with continuation schools from 14 to 16.

The question fairly may be asked whether the social reform program as worked out in Great Britain in the early twentieth century actually achieved its purposes. Much good was accomplished; individual lives were made happier and better, and many a man had years added to his life because of what Lloyd George and his colleagues did. Yet depressions were not averted. They continued to recur intermittently, with such frequency that economists began to try to work out a "trade cycle," which would make it possible to foretell the next visitation. Nor is there any indication that the visitations were decreasing in seriousness.

The theory underlying the social reform program seems sound. The sums handled by the state in Great Britain and in other countries where it was adopted were extremely large. The rate of taxes to raise these sums seemed to the rich positively staggering. However, it must be admitted that the social reform program has not succeeded in effecting that stabilization of economic development which was expected of it. The chief factor in this fundamental failure seems to lie outside the social reform program itself, in the fact that all that was done was done on so small a scale (in spite of its seeming bigness) as to have no real effect on the volume of production. The original view was that enough of the product of

industry must be diverted from the capitalist and salaried classes and turned over to the workers who could and would use it, so that there could be no stoppage of production at peak volume through oversaving and accumulation of a choking surplus. While the rich regretted losing even part of their incomes to support old age pensions or unemployment insurance, they never were asked to give up enough, except in individual cases unusually circumstanced, to make any considerable difference in their ability to "over-save."

The social reform legislation of the Liberal Party in England was a great achievement in that it ameliorated the lot of the poor and gave some security to the working classes in unemployment, illness, and old age. But the program was scarcely on the statute books before the masses discovered that what was being given to them on the one hand in social legislation was being taken from them on the other by a steady rise in prices. They expressed their discontent during 1911 and 1912 by a series of strikes which were unique in their national scope and in the ideas which floated over them. The only reply of the politicians, apart from special concessions such as boards to fix wages in the mining industry, was the announcement of an advance, a grand advance all along the line. What this grand advance was to be those who proclaimed it themselves probably did not know. They were spared from the trouble of discovering it by the outbreak of the war in 1914.

The Intensification of Nationalist Sentiment and the More Recent Imperialism

There was one unfortunate, nay disastrous, twist given to men's ideas by their thinking about economic problems. As President Theodore Roosevelt put the matter in his famous speech on the "new nationalism," it was the duty of the nation to secure a better chance for the masses by the restriction of special privilege. Yet in accepting the notion that the remedying of their ills must necessarily proceed along national lines, men envisaged antagonisms between their own economic advances and the progress of other countries. This feeling is, of course, a carry-over from the far distant past. It was given renewed vitality during the early 1880's as nation after nation raised its tariff schedules to keep out its neighbors' goods. It was, of course, not the only element in na-

tionalism, nor even, perhaps, the one most active in the early twentieth century in creating a sense of rivalry between nations. Yet it is hard to see how nationalist sentiment could have become so intense if there had not been at the bottom the feeling that one nation's economic security could be gained only at others' expense.

As an alternative to the Liberal program of social reform legislation, in 1902 Joseph Chamberlain and the Conservatives offered tariff protection against foreign goods. A plea was raised for the prevention of the competition of the pauper labor of other countries with the highly paid labor of Great Britain; but the real feeling was that the home market should be reserved for the home producer. There was a fear that the more efficient workers of other countries might swamp British manufacturers. In raising the demand for the adoption of a protective tariff policy, Joseph Chamberlain linked it with the idea of imperial preference. He presented "tariff reform" (upward) in the election of 1906 as a panacea for England's economic ills. The majority of the electorate rejected his proposals then, and again in 1910; but in 1915, under the plea of necessary restrictions upon imports to conserve ship-space, England was given certain tariff schedules. These have since grown into a general tariff system. The colonies of the British Empire fell into line with the general trend and raised tariff barriers even against the mother country, with still higher duties against other nations.

While certain manufacturers and agriculturalists demanded tariff protection so that the home market might be reserved to themselves, the financial and mercantile elements interested in oversea expansion sought still more areas abroad where they might have a monopoly of investment opportunities.

As the productive facilities of Europe increased after the opening of the twentieth century certain interests reverted to the notion that the export of capital to the colonial world was after all the easiest way out. Promoters and financiers holding such views now turned their attention, not to barbarous Africa, but to that belt of ancient cultures which stretched from Morocco to China. Here among peoples densely settled and highly civilized, but lacking the mechanical appliances which Europe was so well endowed to furnish, there might be found the new markets which Europe needed to keep her industry working full time. Moreover, as each

national group surveyed the possibilities, it expressed the conclusion that the land where it operated must be set aside as a monopoly area for itself under the aegis of its national government. There was thus ushered in, beginning about 1900, a second phase of the movement of economic imperialism. As compared with the first phase of the 1870's and 1880's there was a very significant difference in the attitude of European governments toward it. Whereas in the 1880's they had often acted with the greatest reluctance, now they not only cooperated with the business interest involved but seemed often to identify the nation and its policies with such business groups.

The reason for this new attitude on the part of politicians is to be sought first in the more widespread conviction that colonial markets were necessary to take up surplus production at home. Of some significance also was perhaps the fact that the interests of their nationals in new lands gave national leaders new sets of pawns with which to play their own peculiar game of international politics.

The imperialistic policy of Great Britain and other nations during the early years of the twentieth century is the political expression of the interest of financiers and industrial leaders in securing opportunities for the export of capital during this period. The quantitative aspect of this movement may best be seen by the figures for net capital export.

During the decade of the 1880's investments of capital by British subjects in overseas enterprises began a remarkable recovery after the break which was caused by the great depression of the later 'seventies and early 'eighties. In the years from 1886 to 1889 the figures ranged from £60,000,000 to £80,000,000 annually. The decade of the 1890's witnessed a decline in British financial activity in overseas areas, probably because increased home consumption took a greater proportion of the domestic production of goods. During the period of the Boer War there was a considerable diversion of production capacity to war service, with the result that in 1901 British capital exports fell to £13,000,000 and in 1902, to £11,200,000. There was a rapid rise beginning in 1903, corresponding to the increasing capacity of British industry during the beginning of the new century. By 1906 British investments abroad mounted to £104,000,000 a year; in 1912 they rose to £226,000,000 a year. It is estimated that in 1914 British

subjects held overseas stocks, bonds, and other types of securities representing British outlays for construction, loans, and purchases to the amount of £3,500,000,000. About one-half of this sum was invested in North and South America, with the United States heading the list of countries in which British subjects had invested their capital. Canada came next, with total British holdings of £373,000,000. These were being increased at the rate of £40,000,000 a year through public loans and private investments. Australia and New Zealand together had taken £380,000,000, of which two-thirds was in the form of government loans. In South Africa £351,000,000 had been invested, of which a third was represented by mining enterprises. India had absorbed £365,000,000 of British capital, mostly for railway construction. Outside the empire, Argentina, next to the United States, had been the scene of the greatest British activity; in railways, meat-packing plants, and other industries the British had investments of £269,000,000. Brazil and Mexico had received about £90,000,000 each from the British financial world. British holdings in Japan, Egypt, and Russia were around £50,000,000 each.

The largest items of British investments, classified according to the kind of business involved, were, in American railways, £600,000,000; in colonial and provincial government loans, £375,000,000; in foreign railways, £286,000,000; in colonial railways, £189,000,000; in land and banks, £187,000,000; and in gold mines, £161,000,000. Except in the case of the gold mine holdings, the average return on all these classes of securities was under 5 per cent. In the case of gold mines it was 9.3 per cent.

Capital investments abroad were not growing nearly so rapidly as those in Great Britain, but because they were regarded as a necessary means of absorbing capital, plant capacity, and labor which would otherwise have been idle, they were held to be of very great importance. Curiously enough, the amount of relief given to British industry and British labor was not nearly so great as the figures for British investments would seem to indicate. A growing proportion of the annual additions to British holdings consisted of the dividends and earnings which were not brought home, but were reinvested abroad. In the year 1890 the earnings on British investments overseas were £91,500,000. Of this only a net sum of £8,900,000 was brought home and £82,600,000 were

reinvested. This situation seems to have been intensified during the twentieth century. The older areas could not absorb as much new capital from Great Britain as was available; outlet areas had to be found in new colonies.

In its territorial and geographical aspects the British imperialistic advances brought Egypt more securely under British control, created a sphere of influence in Persia and the Persian Gulf, staked out an economic preponderance in the Yangtze Valley, and overwhelmed the Dutch South African Republics. Vast amounts were invested in Canada and Australia. Economic connections with certain South American countries were strengthened, though no political ties were ever contemplated. On the other hand, in order to secure her position Great Britain had to recognize seizures by other nations elsewhere, such as those of Japan in Korea and of France in Morocco; and as a result of the maneuvers of foreign office politicians she found herself tied up in an understanding with one of the two power groups of Europe, the Dual Alliance of France and Russia, and at odds with the other, the Triple Alliance of Germany, Austria, and Italy. Just a few months after economic arrangements had been made in the spring of 1914 which might have resolved international questions, the entanglements of her political understandings plunged Great Britain into the World War of 1914-1918. This war brought to a crisis so many economic changes, already under way, that it may be regarded as a catalytic agent in the transformation of British social and economic life.

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Chapter 29

THE FIRST WORLD WAR AND ITS AFTERMATH

WHEN war broke over the world in the summer of 1914, the British people were still devotees of the gospel of free trade and laissez-faire. True, they had just taken serious departures from their faith in the period from 1908 to 1912 by adopting the liberal social reform program, but the deeper implications of the new measures were scarcely recognized. Had anyone questioned Englishmen regarding the matter, they would have explained that old age pensions and sickness and unemployment insurance were merely necessary concessions to keep the laissez-faire system going. Certainly Great Britain's rejection of tariff reform was proof of her determination to have nothing to do with a planned, controlled, or regulated society.

Yet almost overnight the British people were given an experience of regimentation and social control which, meant merely to be "for the duration of the war," taught people to give up their insistence on individualism and prepared the way for the permanent abandonment of laissez-faire and free trade.

Happy as early twentieth-century British society may appear to those looking back on it from the valley of our present discontents, it was actually shot through with poverty. Great Britain did not produce enough wealth each year to give every person the desirable standard of comfort. Of course, under these circumstances, the excessive wealth of a few was all the less defensible; but it is now recognized that if all wealth had been evenly distributed, there would not have been enough of the comforts and good things of life to go around. Consequently the social reform program of the Liberals may be regarded as playing around the edges of the real issue, which was the increased production of

wealth. This statement does not detract from the value of the real benefits bestowed on the masses through the better distribution of what there was, which was effected by old age pensions and social insurance. Rather, it points out the necessity, unrecognized in the years before the war, of a rapid rise in British production, if there was to be enough wealth for all to have at least the material basis of the good life.

In the period from 1910 to 1914 the aggregate annual income of the British people was about £2,000,000,000. After \$300,000,000 for necessary capital replacements and taxes for the support of the government were deducted, there were thus available on the average about £170 annually (\$850) for a family of five. These figures represent income produced in Great Britain. In addition, there was brought home from investments abroad about £90,000,000 a year, or about £10 per family. If the average family be taken as $4\frac{1}{2}$ persons, as it actually was, the average net family share of home-produced income would have been £153 a year. An additional sum of £9 a year would have to be added for income from investments abroad. In all conscience this was not enough.

As national income was actually distributed, a million or so families received on the average a little less than £800 a year if income from abroad be omitted, and about £900 a year if income from abroad be included. The remaining nine million families averaged only £125 a year. Sixty-two per cent of the individual workers earned between 20 and 35 shillings per week. Twelve per cent earned less than 20 shillings per week, 13 per cent between 35 and 40 shillings, and 13 per cent over 40 shillings per week. Actually, even before 1914, £800 a year did not represent the means of extravagant luxury. The number of the rich and the very rich (with incomes over £2,000 a year) was just a little over 50,000 individuals. It would probably have been a good thing for the rich and the very rich themselves if they had had less money, but even if their incomes had been confiscated entirely, the great masses would have had scarcely more than an extra pat of butter a week.

The real need was not to cut down the level of the incomes of the comfortable classes but to raise those of the masses of the people. The only way of doing that effectively was through the increase of British productivity, attended by the creation of such

controls as would prevent the newly created wealth from going exclusively to the benefit of the already comfortable classes. Such a program premises the acceptance of social planning and social control in economic life. The war did three things. Its demands for materials led to a revolution in British production. Changes which attended its progress brought about a considerable redistribution of British wealth as between the various classes of the population. Social control by the state was greatly extended. In addition, on the other side of the ledger there were brought into existence a great national debt and many problems of readjustment.

The Revolution in Production

During the early years of the twentieth century British captains of industry, agriculture, and finance seem to have lost a certain amount of the initiative and enterprise which had distinguished them during the nineteenth century. They were less inclined to introduce new machinery than were the Americans and Germans; and in some cases they were prevented from doing so by agreements with the trade unions who guarded against the displacement of workmen or the lessening of the value of the acquired skill of an operative by restricting the introduction of new machinery and new processes. British industry, in many lines, was certainly not contributing to that increase in output which was necessary to bring about a greater national income.

From their lethargy British industrialists were aroused by the exigencies of the war, and British industry was brought up to date. Under the compulsion of the demand for war materials, trade unions were asked to surrender their restrictions upon progressive innovations and employers were forced to adopt the automatic machine, pool trade secrets, and operate under government control. Legal compulsion to make this program effective was applied in the Munitions of War Act of 1915.

In March, 1915, the battle of Neuve Chapelle, in which to no avail the British had expended as much ammunition as had been used during the whole of the Boer War, had brought home the necessity of increasing the rate of the British production of munitions of war. On March 17, 1915, after a conference between trade unionists, employers, and certain cabinet ministers, a mem-

orandum known as the Treasury Agreement was issued, providing that trade practices, that is restrictions in the interests of skilled workers, should be relaxed in munitions works and that strikes and lockouts should be prohibited. In June, 1915, the Munitions of War Act went further. It set up government control of munitions plants, ended regulations restricting output, gave legal force to the prohibition of strikes and lockouts, and provided for the limitation of profits. Under this act and its later amplifications the government forced the introduction of the most modern methods of production in all munitions works. Even those industries not brought under government regulation were induced by the force of example or competition to modernize their plants and processes. Many new factories with the most modern machinery were opened. Old plants which could not be transformed held on as long as they could and eventually many of them were forced into bankruptcy and thus taken out of the picture.

The German submarine campaign, with its threat of food shortage, exercised a similar compulsion on British agriculture. Four million acres of land were brought under cultivation and the production of grain in 1918 was sufficient for more than half of the total requirements of the people as against 20 or 30 per cent in 1913.

On the seas many British ships were out of date when the war began. As they were sunk they were replaced by more efficient types of vessels. The railways were taken under government control as soon as the war started. Centralized management in the national interest was so obviously advantageous that there was no possibility of a return to the older arrangements, and after the war the many small companies were grouped in four great systems, each serving a section of Great Britain.

The Redistribution of British Wealth

For more than ten years before the war began there had been a noticeable rise of prices. Since money wages were pretty nearly stationary, there had been a slow fall in real wages. Shortly after the war began prices moved upward dramatically. Using the year 1914 as a base, with a rating of 100, average prices stood as follows:

1915	105-110
1916	115-120
1917	135-140
1918	175-180 ^j
1919	210-215
1920	260

The figures for the cost of living, on the basis of 100 in 1914, were:

1915	123
1916	146
1917	176
1918	220
1919	225
1920	260

After 1920 prices fell again, so that the cost of living stood at 140 in 1933. This was the low point of the post-war years and was followed by a slow rise.

The first effect of the rise in prices was to reduce the purchasing power of all classes. The energetic entrepreneurs, the "war profiteers," of course knew how to help themselves or were helped by the very volume of war business to increase their profits. Those who had fixed incomes from bonds, mortgages, leases, and rents were in a very serious situation. Many of the "well-to-do" found themselves increasingly worse off, and "the new poor" aroused a good deal of amusement during the war years. The working classes were likewise at first adversely affected by the price movement. But they were in a better position to strike back than were the old comfortable classes. Thanks to their trade union organization, they were able to conduct great strikes or to bargain collectively for raises in pay. The best organized groups increased their wages, even during the war period, more rapidly than prices advanced. Most workmen, however, could not do this; and in 1918 the average real wages were only 89 to 91 per cent of those in 1914. By 1919 they had reached 98 per cent; in 1920 they stood at from 102 to 106 per cent and in 1921 at 109 to 112 per cent. In other words, workingmen generally were able to increase their wages so that they not only had as large a share of the national income in 1920 as in 1914, but a great deal more. Moreover, thanks again to their trade union organization, they were in a position to resist reductions in rates of pay in the

period after the conclusion of the war. Although unemployment cut deeply into their gains between 1922 and 1925, the working classes were able to hold the advantage which they had won. The new rates of pay were maintained to such an extent that in 1933 real wages were 17 per cent above the level of 1914.

The rise in prices, then, injured the old wealthy classes and benefited the working classes. It reacted in another way also, giving an advantage to debtors against their creditors. The state, as the greatest debtor of all, wrote off a considerable part of the burden of its war borrowings. Great corporations, in so far as they were able to increase the prices of their products in step with the market, reduced the real weight of their bonded indebtedness. Railroads, public utilities, and other businesses which had their prices controlled by public authorities were not in such a good position.

All in all, the rapid price changes of the war and postwar years accomplished probably more by way of changing the distribution of British wealth and especially of British income than all the social reform legislation of the prewar years. The changes benefited the masses of the people together with the entrepreneur groups at the expense of the classes which formerly had received a large share of the national income in the form of interest and rents.

Extensions of State Control

With Great Britain's declaration of war against Germany in early August, 1914, the railways were taken under the control of the state on the ground that private management could not provide the high efficiency of service now required. Shortly thereafter the British government set up a control of British shipping, taking 20 per cent of all shipping for the army and 10 per cent for the use of the Allies. In 1915 all refrigeration ships were requisitioned; liners were required to carry food to a certain proportion of their capacity; and the importation of bulky or non-essential commodities was prohibited. In the latter part of 1916 a shipping controller was appointed with the rank of cabinet minister.

In November, 1916, a beginning was made of attempts to fix the price of foodstuffs. Limitations were set up for the price of

EXTENSIONS OF STATE CONTROL

milk. A maximum price for bread was established without regard to the cost of wheat; differences between flour prices and the established bread prices were to be made good out of the Exchequer. In 1916 a food controller was appointed "to regulate the supply and consumption of food in such manner as he thinks best for maintaining a proper supply of food." The food dictator, Lord Rhonda, fixed maximum prices, restricted profits, gave government subsidies to bakers and potato growers, and eventually, after experiments with voluntary rationing, introduced compulsory rationing for tea, meats, butter, fats, and sugar. A Corn Production Act in 1917 fixed minimum wages in agriculture and guaranteed minimum prices for British-grown grain.

Further extensions of state control are to be seen in the regulation of industries engaged in work on munitions of war already referred to. Strikes were prohibited, trade union agreements were suspended, and profits were limited to one-fifth more than in the period from 1912 to 1914. Maximum prices were established for all finished iron and steel goods and speculative trading in ore was prohibited. Exports of steel were made subject to licenses, and priority regulations were issued, allocating steel, and wool also, between the army and the civilian population. The coal mines were taken under national control in 1915.

There was also a great deal of control imposed upon individuals. By the conscription acts all men in certain age groups were made liable to military service. Trained men in private work were subject to being withdrawn from their jobs and placed in munitions plants, and their places were taken by unskilled workers. This and other forms of "dilution of labor" (replacement of skilled men by unskilled men and above all by women) were bitterly contested by the trade unions, who were scarcely satisfied with promises that all "dilution" would be ended with the coming of peace. Actually, once the favored position of the skilled trade unions was set aside, it proved impossible to restore it.

The actual arrangements of the war period involving extensions of state control are perhaps less important than the habits of thought which these practices engendered. The advantages of collectivization as practiced during the course of the war were so patent that a return to the cut-throat inefficiencies of the laissez-faire period was unthinkable. The masses and the classes became

accustomed to regimentation. Even their drinking habits were subjected to the most rigid control.

These developments, which might have resulted in much added happiness for the greater part of the British people, were accompanied by others less promising. Although taxes were increased during the war years in the hope of paying a certain part of the costs of the war out of current government receipts, the larger part of the disbursements of the period was met by borrowing. The total expenditures of the British government from 1914 to 1919 were £11,259,000,000, or about \$55,000,000,000 at the normal rate of exchange. Of this sum £8,742,000,000 were spent on the war. The sum of £4,073,000,000 was derived from revenue; the rest was borrowed. The national debt was increased from £708,000,000 on March 1, 1914, to £8,075,000,000 on March 31, 1920. The expenditure of over \$40,000,000,000 in fighting Germany meant that the British people had destroyed a large part of their accumulated wealth in the form of stocks, supplies, and equipment as well as much new wealth that was created during the war period.¹

The existence of the debt meant that all those people who worked on war work had been permitted to enjoy immediately the rewards for the greater effort which they put forward to win the war at the charge of those classes which were willing to postpone the use of their wealth until some future time. But those who postponed their pleasures by buying government bonds counted on being paid back; and the state was obligated to pay them interest at the rate of a million pounds a day. These interest payments represented a first charge on British resources and were almost twice the amount of the total government expenditures before the war. The maintenance of other government functions, expanded or assumed during the war years, added other large amounts to the annual British budget. As a result, in the 1920's the average annual expenditures of the state were four times as great as they were in 1914. Taxes were in consequence permanently raised to higher levels, especially in the income and estate tax classifications. Yet for the most part higher taxes simply represented further changes in the distribution of the national income to the advantage of bondholders, unemployed persons, civil serv-

¹ The figure £8,075,000,000 includes the United States debt "and amounts owing by allied powers to Great Britain."

ants, and politicians, and to the disadvantage of the middle and upper-class income tax payers.

Fundamentally the war did not impoverish Great Britain. A large part of the wealth represented by war expenditures was created during the course of the war by the more intensive efforts of all sorts of persons in war service. Certain types of machinery and apparatus were worn out. Many ships were sunk. Air raids took their toll of English cities. The British people had parted with a large part of their American securities to pay American manufacturers and dealers for materials and munitions purchased in the United States. Large debts were left owing in the United States, which have only partly been paid. Great Britain herself had experienced little military destruction; no armies had fought each other across her soil. Great Britain's man power was not greatly impaired. Her industrial regions were intact. Her financial structure was sound. For such losses as they had the British recouped themselves to some extent by taking over the greater part of the German colonial empire. They gained great advantages from the financial difficulties created for the Germans, their great commercial rivals, by the levy of reparations upon Germany.

The major difficulty of the postwar years lay in the impoverishment of Europe, which before the war was Great Britain's greatest market. Ten million men were dead; hundreds of square miles of land were barren wastes of shell holes, trenches, dugouts, and dumps. Supplies were in large part exhausted everywhere east of the Rhine; private and public finance were disorganized; and revolution stalked through country after country to heap destruction upon destruction. The British discovered within a few months after the signing of the peace treaties that a poverty-stricken continent could not buy; and that want might drive rivals to cut-throat competition.

Problems of Postwar Readjustment

The premier consideration of the postwar economic history of Europe is that Great Britain emerged from the war scarred but, materially speaking, sound, while the continental nations were spent, impoverished, and disorganized. For a brief period after the signing of the armistice purchases of supplies in heavy quantities were made from Great Britain by many European states

for the purpose of covering their shortages. Many businessmen looked for an indefinite continuation of their wartime prosperity. In the fall of 1920 such purchases (made, incidentally, at exorbitantly high prices and often on credit) rather suddenly stopped, and there was precipitated in England what is sometimes called the primary postwar depression.

The first effect of the cessation of buying on the part of European countries was the appearance in Great Britain of a considerable volume of unemployment. It then began to be recognized that the wartime increases in industrial efficiency were so great that British industry could turn out more goods than had been produced before the war. Or, to put the matter in another way, the volume of goods made in the prewar years could be manufactured by a much smaller number of workmen using the improved machinery and techniques which had been developed as a result of the exigencies of the war. British shipping and shipbuilding may be taken as examples of wartime developments. In 1914 Great Britain had 18,000,000 tons of steamships. Eight or more million tons of ships were sunk by submarines and mines. Yet so efficient had British shipyards become, so greatly had they been enlarged and extended, that by November 11, 1918, all but 2,250,000 tons so lost had been replaced, and by 1922 a new high level of 19,080,000 tons of British ships afloat had been reached. Much warship tonnage was also built. In 1913 British shipyards had been strained to capacity with 2,000,000 tons of ships on the ways; at the end of 1919 3,000,000 tons were under construction in British yards. The new ships were better and more efficient than the old ones had been. If all British workmen were to be employed, there must be an important extension of British markets.

Such extensions could not be looked for on the continent of Europe. It was soon discovered that there were other reasons in addition to the poverty and exhaustion of the continent which made for this situation. The first was that during the course of the war manufacturing had been developed in many areas hitherto untouched by the blessings of machine industry. In all such countries the people and their governments were eager to continue to work in factories; and to preserve their newly founded industrialization they built high tariff walls around their lands. These were paralleled by the Fordney-McCumber and the Hawley-

Smoot tariffs in the United States, which severely restricted foreign sales in that country also. Every nation was trying to become a self-sufficient unit. British development ever since the beginning of the Industrial Revolution had been based on the premise of a world market for a large part of British production. No tariff wall is unsurmountable; and in the course of time trade flowed again in spite of protective barriers. Yet for a time these barriers interfered seriously with British prosperity.

Worse than the reactions of nationalistic tariff policies upon British trade were the results of political and financial disorganization in Russia and in Germany.

The Russian problem was the simpler. The Russian people had accepted the government of the Bolsheviki and the Communistic system. The British government refused to recognize the new Russian government. Consequently trade between Russia and Great Britain was entirely cut off for some years after the war.

In Germany the departure of the imperial Hohenzollern dynasty in favor of a republic had the blessing of Great Britain. In making peace with Germany, however, the British government and its Allies were every bit as severe as they could have been with the old regime. The most stringent terms that the minds of the Allied leaders could think of were imposed. Among other things, contrary to the word pledged by the Allied governments to President Wilson, they imposed upon Germany a heavy indemnity, as a contribution toward the allied costs of the war. On top of this, provisions were laid down which made it impossible for the Germans to pay, except to a very limited extent, in anything but gold. The Germans had no willingness to pay in any form, and much that happened was due to their obduracy. To get the gold with which to pay the allied reparations installments German paper money was sold in New York. With every sale, the increasing volumes of paper money drove down the value of the German mark until at one point German marks were worth twenty cents a trillion. The high price of gold and of its equivalent in foreign exchange reacted very severely upon German industry, since prices of raw materials were raised to abnormal levels in terms of paper marks. On the other hand, one curious fact soon became evident; namely, a lag between the fall in the value of paper marks abroad and their value within Germany.

Prices in Germany expressed in paper marks, together with German wages, rose less rapidly than the value of the mark fell abroad. This made it advantageous for traders to buy marks in New York and use them in Germany to purchase goods for export, especially commodities in which wages and native German raw materials represented a large part of the cost. The result was a tremendous flood of exports from Germany sold throughout the world at despair prices to the detriment of British and other manufactures. Books, works of art, pianos, furniture, cameras, binoculars, fine cloth, and precision instruments could be purchased very cheaply with marks secured in London or New York and cabled to Berlin.

Those British interests which had been congratulating themselves that they had lost a competitor as a result of the terms of the Treaty of Versailles now discovered that they had let loose a pestilence which must be controlled, if Great Britain was to save her foreign trade. The recovery of British trade in Germany was in itself an item of considerable importance. In 1924 both the Russian and German problems were dealt with. A trade agreement was made with Russia, although formal diplomatic relations with that country were not as yet resumed. A new reparations agreement, known as the Dawes Plan, was arranged with Germany. The mark was placed on a gold basis and arrangements were made to permit the borrowing abroad of money to make reparations payments. Five years later Russia was restored to good standing by the full recognition of its government by Great Britain. A new settlement of the reparations question was arranged in the Young Plan, which, while still unsatisfactory to Germany, at least held out the hope of the cessation of reparations payments (which again could be borrowed abroad) in sixty-nine years.

British foreign relations during the 1920's centered about the purpose of opening new markets abroad and of ending the unfortunate German competition which the Treaty of Versailles had created. The major issue in domestic politics was the provision to be made for those workers who were unemployed because the potentialities of production were beyond the consuming power of foreign and domestic markets. Secondary to this was the issue of whether the higher real wages won by labor should be maintained or forced down to the levels set by the existence of a large number of unemployed.

The Problem of Unemployment

During the war unemployment had been negligible, and employment remained at a high level until the end of the summer of 1920. With the stoppage of purchases by the peoples of Europe many factories were shut down and men and women were laid off. In August, 1920, only 300,000 persons in Great Britain were unemployed. By December the number had mounted to 750,000. A year later the figure stood at 2,000,000, after which it began to fluctuate with a downward tendency until 1929. It never got under 1,000,000, however, and politicians, labor leaders, and employers began to say that Great Britain must expect to have an army of 1,000,000 unemployed as a permanent thing. In 1921, at the peak, about 15 per cent of all workers were without jobs. As far as statistics are available this number was much greater than the percentage of unemployed at any time since 1870.

The widespread extension of the franchise in 1918, which made virtually every man over twenty-one a voter and extended the ballot to many women over thirty, made unemployment and the related problem of the maintenance of the new wage scales matters of greater political importance than such things had been in the past. Unemployed voters could not be left to shift for themselves.

In anticipation of certain disturbances in the labor market occasioned by the coming of peace, as early as 1915 the government had enacted certain legislation giving out-of-work benefits to soldiers during twelve months following their discharge. In November, 1918, an out-of-work donation was arranged for, effective for six months for civilians discharged from war work and for twelve months for soldiers who were demobilized. The benefits were eventually fixed at 29 shillings a week for men and 25 shillings for women, payable in 39 weeks out of 52 for soldiers, 46 weeks out of 52 for disabled soldiers, and 26 weeks out of 52 to civilian war workers. This out-of-work donation was what was properly known as "the dole." It was continued until 1924, and cost the Exchequer the sum of £102,000,000.

Much more important than the out-of-work donation was the extension, in 1920, of the unemployment insurance provisions of the National Insurance Act of 1911 to cover all workers earning

under £250 a year except those engaged in agricultural occupations or domestic service. Premiums were paid jointly by the employee, his employer, and the state. About 12,000,000 persons were insured against unemployment by the new law, which was enacted before the trade crisis was reached. Unfortunately, there were no good actuarial data for the arrangement of the scale of premiums and benefits, because there had been no sufficiently long normal period since the adoption of the original act in 1911 to acquire much valid experience. Consequently, the relationships arranged between premiums and benefits, while pretending to be on an actuarial basis, were as near to pure guesses as anything might be. The premium represented what the technical experts and the politicians thought the insurance fund could collect; the benefits, what they thought the workers needed for maintenance. In a true insurance scheme premiums paid in must equal benefits paid out, and there must be strict regulations to be observed before benefits may be claimed. Actually these things were not provided for or, if provided for, were soon relaxed.

Under the first postwar act benefits were fixed at 15 shillings per week for men who were unemployed and 12 shillings for women, with the limitation that six premiums must have been paid for every benefit drawn. It was soon discovered that many had paid so few premiums before they lost their jobs that they were entitled to few or no benefits. Consequently the idea of uncovenanted benefits was introduced, extending benefits even after the statutory relationship between benefits and premiums had disappeared. In 1921 benefits were raised to 20 shillings per week for men, 16 shillings for women; the payment of uncovenanted benefits was greatly extended, and the joint premium contributions of the employer, employee, and the state were considerably increased. Various changes were made in the years which followed, always with a view to keeping the fund as solvent as possible, to paying the highest possible benefits, and exacting the smallest possible premiums. In November, 1921, provision was made for grants to dependents of five shillings extra for a wife and one shilling for each child, on condition of the payment of extra premiums.

Some notion of the scope of the assistance rendered to the unemployed after 1920 may be gained from the financial reports of the National Insurance Fund into which all premiums were

paid and from which all benefits were drawn. At the time of the armistice in 1918 the fund as set up in 1911 showed a balance on hand of £15,000,000. Between the armistice and March 1, 1924, the contributions of employers came to £54,000,000; of workers, £49,000,000; and of the state, £35,000,000. Benefits paid during this period came to £154,800,000 (\$775,000,000). Administration cost £13,000,000. Not only was the balance on hand used up, but the fund was forced to borrow over £11,000,000. As the years went on and as the rates of benefits were increased and the payment of uncovenanted benefits continued, the borrowings of the insurance fund rose proportionally.

Where the out-of-work donation and the unemployment insurance benefits did not suffice, the workmen out of jobs had to apply for relief to the poor law authorities. Between April, 1920, and January, 1924, they handed out their frozen charity to the extent of perhaps £25,000,000 to those who were unemployed. In this same period poor law relief for the chronically indigent required additional expenditures.

There were other devices also for handling the problem of relief during the postwar years. Grants to local authorities of 60 per cent of the wages bill on approved public works were authorized, and Exchequer loans were extended to them for roads, sewers, parks, water, gas, and electric mains, and tramway undertakings. The Ministry of Transport assumed 50 per cent of the costs of bridges and arterial roads. Loans and direct Exchequer subsidies were made to local authorities and private contractors to further the building of working-class housing. In a general way public works were looked upon with disfavor as a more expensive and a more wasteful form of relief than direct maintenance and except for the road building and housing programs, which were not considered as relief measures, much less attention was paid to public works than was later the case in the United States.

More real benefit was expected from the stimulus to trade provided by government credits and loans. Under the Overseas Credit Scheme the Board of Trade was authorized to grant credits to exporters to enable them to sell British goods on credit in foreign markets, and the Trade Facilities Act authorized loans guaranteed by the Treasury up to £65,000,000, on projects calculated to promote trade and increase employment. Great benefit was likewise expected from the deflation of prices and wages to

their 1914 levels. There was perhaps more concern with forcing wages down than with reducing prices. Attempts to alter seriously the higher wages of the war and immediate postwar period resulted in strikes on a national scale in industry after industry. Since these were generally successful in preventing serious cuts, it was now hoped that deflation might be accomplished more painlessly by fiscal manipulation. During the war Great Britain had virtually abandoned the gold standard and gone on a paper basis. Paper money had fallen, in exchange value, to a good deal less than gold. In 1925 gold payments for paper were resumed, on the 1914 footing.

Prices and wages did not return to their 1914 levels.² Prices fell somewhat; wages fell scarcely at all. The burden of interest on the national debt was somewhat increased. With the rise of the value of the British pound in the exchange markets, the price of British goods to foreign purchasers expressed in foreign currencies rose. The resulting situation was not at all satisfactory. Many businessmen who had invoked the national honor as a reason for the return to gold now began to feel that their gesture of honesty worked more hardship than the national honor was worth.

Economic Readjustments

The war brought home to the British people the idea that in many particulars their industrial system was a little old-fashioned and that their agriculture was hampered by age-old survivals. By legislation of 1926 the last vestiges of the manorial system were swept away. Manorial courts were abolished and copyhold tenures were brought into conformity with freehold. Rates and local taxes were reduced. During the 1930's further relief was afforded to the farmer by arrangements for the abolition of the tithe.

² COST OF LIVING AND WAGES

1919.....	225	220
1920.....	260	290
1923.....	177	170.75
1924.....	180	165.70
1925.....	175	170.75
1926.....	175	175
1927.....	168	170.75
1928.....	167	170.75
1929.....	164	170.74

Where enterprising farmers with adequate capital engaged in farming, they could make it pay. In some cases entire villages were brought under single control and managed as a unit, growing grains and grasses specially hybridized for the particular soil and rainfall of the district.

In industry the war had forced the abandonment of out-of-date methods at least in those kinds of factories engaged in war work. In the years after the war this example was followed elsewhere. Old factories built fifty or even a hundred years before were abandoned in favor of bright new units in which automatic machines superintended by fewer workpeople turned out more (if not better) goods. Great economies were effected also by what was called "rationalization," that is, the organization of production along "rational" or scientific lines, with the elimination of waste, the transformation of costly processes into cheaper ones, the reduction of overhead charges and so on. Rationalization, as a consequence, involved the merger of industrial concerns into greater trusts than the past had known. Thus the soap trust (Lever Brothers) was fused with the English margarine union to control the production and manufacture of all vegetable oil products, and the chemical industry was "fully rationalized" by the formation of a vast chemical trust known as Imperial Chemicals. There was much talk about rationalizing the coal-mining industry and legislation authorizing this move was actually introduced into Parliament in 1929.

As a result of the changed distribution of income caused by the shift in prices and rates of wages, there was a considerable increase in the demand for consumers' goods in the home market. Manufacturers who produced cheap goods which the masses wanted prospered. The export trade was, however, badly disorganized. The foreign markets for those goods which had been the staple British exports before the war, such as cotton, coal, steel, and machinery, seemed to have permanently reduced the volume of their purchases, and the producers and workers in these lines were "hard hit."

Demands for Protection

It must be recognized that during the disturbed years after 1920 there was as much or more unemployment of capital and

plant as there was of labor. While many industries kept going and made good profits, others were very seriously affected by the current trade crisis. Their owners and managers were just as eager to get back to full work so that they could earn profits as the unemployed were to find jobs. The various measures for the relief of unemployment by stimulating trade represented the government's program of getting workers back to their jobs by assisting their employers to develop their business. In the eyes of many employers this kind of relief did not go far enough. They began to demand the exclusion of foreign goods from British markets by means of a protective tariff.

When the war began in 1914 England was a free-trade country. Such tariff schedules as there were, designed strictly to raise revenue, were laid on goods, such as tea, not produced in Great Britain at all or on articles such as silver plate upon which there was a domestic excise when it was made in Great Britain. In 1906 and again in 1910 the British voters had decisively rejected the adoption of a protective system. In 1915, in order to conserve ship-space, Reginald McKenna, the chancellor of the Exchequer, recommended the imposition of certain duties upon bulky luxuries. The promise was made by the government that duties of this kind would not be continued when the war was over. In 1919, however, Austen Chamberlain, then chancellor of the Exchequer, recommended the retention of these duties, and they were thereafter accepted as permanent. These McKenna duties were the entering wedge of protection, although not introduced for that purpose. In 1920 came a Dye Stuffs Act giving tariff protection to British-made dyes. In the next year the German Reparations Recovery Act in effect imposed a tariff on German goods. These preliminary measures were followed by the Safeguarding of Industries Act, designed to give tariff protection to such key industries as had been introduced during the war and might not be able to stand the force of German competition. Some six thousand articles were given protection under the skirts of this act. They included optical glass, scientific instruments, medical chemicals, as well as dolls' eyes, glass flowers for hat trimming, and children's magic lanterns. A duty of one-third of the value of the goods on the day they arrived was levied. An anti-dumping act prohibited the sale of goods at lower prices in England than in the country of their origin.

From 1918 to 1922 Great Britain was ruled by a Coalition cabinet of which David Lloyd George was prime minister. While the Coalition government disavowed any purpose to introduce a protective system, the Conservatives, who shared the control of the Coalition cabinet, began to talk about protection for agriculture and for industry generally. When Lloyd George refused to go beyond the Safeguarding of Industries Act, the Coalition government was ended by the Conservatives. A new Conservative government came into office in October, 1922. In an election held in December, 1923, the new government asked for a mandate from the country to introduce a change in the fiscal system. The proposal was rejected by the electorate, and in January, 1924, a Labor cabinet came in. The first Labor budget repealed all existing protective duties, but the Conservative government which returned to office in November, 1924, reimposed the McKenna schedules. In the progress toward a protective system which was made during the 1920's the idea of imperial preference was not overlooked. In fact, certain politicians saw in the present disturbed conditions an opportunity for turning the British Empire into a closed economic area, trading freely between its parts and independent of the outside world. They were willing to cut loose from the wreck that was Europe and let it "stew in its own juice." A mild beginning in this direction was made in 1919. On films, watches, clocks, motor cars, and other goods taxed under the McKenna schedules there was a rebate of one-third on those of British colonial origin. On tea, cocoa, coffee, sugar, dried fruits, and tobacco, on which revenue duties were collected, there was a rebate of one-sixth. Colonial wines were given favored treatment also. The one flaw in the scheme for a closed economic empire was that many of the colonies wanted to develop still further their manufactures and were unwilling to accept the place assigned to them in the imperial economy as producers of imperial raw materials and consumers of British factory products.

Behind these various projects to lift Great Britain from the slough of depressed business there were already some notions of a planned national economy. These were as yet of little significance, since actually, in spite of great numbers of unemployed workers, much idle plant capacity, and restricted foreign trade, Great Britain was making substantial economic progress in the

decade after the war. Certain trades, such as the cotton-spinning trade, were declining in the face of changes in fashions and of world competition, and among the workers and capitalists connected with these trades there was much hardship. On the other hand, many new lines of manufacture had been developed, such as the rayon industry, and as these expanded great profits were made. Many individuals were badly off, but the nation as a whole was essentially prosperous.

British Postwar Prosperity

A number of pieces of evidence of British well-being in the years which followed the war may be cited. They will serve to counteract the widespread feeling that, because there was much unemployment and marked depression in coal mining and in certain industries manufacturing for export, there was a general decline in industrial activity and a fall in national prosperity. In the first place, all of the unemployed were being provided with at least a minimum standard of comfort. Some of them were as well off, materially speaking, without jobs as with them. It is scarcely necessary to worry about the capitalist classes who suffered because their capital was unemployed or depreciated or who were pinched by the extra burdens of taxation. These people have a way, through sheer ability, to rise superior to circumstances, even though they often make a good deal of noise in advertising their parlous condition.

A strictly quantitative indication of national progress between 1920 and 1930 is provided by estimates of national wealth and income. The estimated national income for 1913 was £2,300,000,000. In 1929 it was £4,400,000,000. This was offset by an increase in the interest charges on the national debt from £24,500,000 in 1913 to £369,000,000 in 1929. There was also a change in the purchasing power of the pound sterling, owing to the rise in prices. Reduced to 1913 levels, the national income still stood at £3,333,000,000. Since population increased but slightly in the interval under discussion, average money income per head of population in 1929 was almost double the 1913 figure, £96 5s. as against £50. The allowance for price changes since 1913 would still leave an average income per head of £72 in 1929. It is, of course, very hard to be categorical about the real mean-

ing of price changes, and it must be remembered that the term, average income per head of population, is a purely imaginary quantity. There was no even distribution of income or of the increases in income. The rich in 1929 were richer than they were, even though some who had formerly been rich were now badly off. The working classes were, however, generally speaking, better off than they had ever been. Wages were on a higher level than they had been in 1913; and as a result of the fall in wholesale prices by about 20 per cent between 1924 and 1929 real wages were tending to go up. The rise was estimated at between 5 and 10 per cent between 1924 and 1929. The general picture was that of trade activity and velocity of turnover greater in 1929 than in 1913 or even in 1919. There were bad spots in coal, iron and steel, and cotton. Yet other trades were expanding and absorbing the slack in the labor market to the extent that there was a 7 per cent improvement in employment between 1924 and 1929.

Housing Reform

As another evidence of British prosperity in the decade from 1920 to 1930, the British people improved the housing conditions of the working and all other classes in a remarkable way. At the end of the war there was a shortage of perhaps a million houses good enough and yet cheap enough for respectable workingmen to live in. The situation had been developing for several decades. In the budget of 1909 attempts had been made to come to grips with it by forcing building land into the market. It was now recognized that the primary factor in the housing shortage was not land values, but the fact that workingmen could not pay the rents which had to be asked for good houses in view of their building cost. This cost had been substantially increased by wartime inflation. The easiest way out of the difficulty seemed to be to provide a state subsidy to make up the difference between the economic rent of a decent dwelling and what a workingman could afford to pay for it.

In 1919 the Addison Act provided for the construction of workingmen's houses by local authorities such as town governments. The costs were to be provided by means of loans from the Exchequer. The rents to be charged were to be about 15 shillings a week, and the deficiencies between the rents which

were collected and interest charges on the loans were to be met in large part by a subsidy from the Exchequer. In all 170,090 houses were built by local authorities under the Addison Act. The subsidy given by the Exchequer, equal to £31 a year per house for forty years, came to £6,750,000 a year for forty years. The Addison Act also provided for subsidies to houses built by private enterprise. Under this arrangement 43,731 additional houses were built, with the help of Exchequer subsidies ranging from £130 to £260 per house.

In 1923 a second housing act, known as the Chamberlain Act, was approved by Parliament. The Conservative government then in office recognized the national benefits growing from the Addison program, but it felt that more stress should be put on private enterprise and less on construction by the local authorities. It wished, moreover, to see the erection of houses just a little above the standard of those built under the Addison Act, so as to extend the benefits of better housing to the higher-paid workingmen and the white collar classes. The Chamberlain Act provided a subsidy of £6 a year for 20 years, which could be claimed by the private builder as a capital sum of £75 payable by the local authorities, who were reimbursed by the Exchequer. These grants, originally designed to end in 1925, were continued at a lower rate until 1929. Under this law 362,738 houses were built by private enterprise and 75,309 by local authorities, at a cost to the Exchequer of £2,500,000 yearly for twenty years. The Chamberlain Act laid down careful specifications for the new houses. For example, one-story houses must have a floor area of from 550 to 880 square feet, and two-story houses must have a floor area of from 620 to 950 square feet. The Ministry of Health, which superintended the housing acts, developed standard plans and specifications and made other regulations to insure builders getting the greatest value for their money.

When the Labor party came into office in 1924 it enacted still another housing law, to stimulate the building of somewhat smaller and cheaper houses by the local authorities. These were to be constructed not only in the cities but also in the agricultural areas, where the picturesque cottages of the agricultural laborers were often sinks of pure iniquity. The Wheatley Act of 1924 authorized an annual Exchequer subsidy of £9 per house for 40 years in urban areas and of £12 10s. per house in rural areas,

with limitations on the rents which might be charged. Under the Wheatley Act 493,449 houses were built by local authorities and 14,936 by private enterprise, at an annual charge to the Exchequer of £3,750,000 for 40 years. The local authorities were authorized to assume an additional subsidy charge, which amounted to over a million pounds a year. In 1927 the Wheatley subsidy was somewhat reduced and extended to 1932. In 1926 attention was paid to reconditioning rural houses and in 1930, in the Greenwood Act, slum clearance was taken seriously in hand.

From the armistice to September 30, 1934, 1,198,317 houses were built under the various housing acts with the help of government subsidies. Many municipalities became great landlords, building and managing housing estates on a vast scale. The London County Council had housing estates far from London itself, covering hundreds of acres, and is said to have become the greatest landlord in the world. Incidentally, during the same period from 1919 to 1934, houses to the number of 1,150,522 were built by private enterprise without financial assistance from the Exchequer. As a consequence of this activity, in 1930 Great Britain, with over two million new houses, was far and away better off, from the point of view of the dwellings of the people, than she had been at any time in her history. Much remained to be done before every Englishman lived in a decent house; but the back of one of the toughest British social problems had been broken.

The National Grid

Another achievement which allowed Great Britain to catch up to the march of progress and increased the general well-being of the people, was the construction of the national grid. In the last year of the war there was a certain amount of discussion of "super power." It was asserted that Great Britain could have cheaper and more abundant electric power if the many small generating stations were replaced by a few very large units, interconnected in such a way that they could be used to maximum capacity most of the time. There were in Great Britain 592 generating stations, with an average of 6550 kilowatts capacity; 340 of these had under 3000 kilowatts of output. Engineers held that only stations above 10,000 kilowatts were capable of efficient production. Moreover, these many small stations, operating in-

dependently of each other, each subject to maximum and minimum loads during the course of a day, actually operated at an average of only 28 per cent of capacity. Where large stations were interconnected so that maximum calls for electricity in one area corresponded to minimum demands in another, the load factor was as high as 57 per cent. Super power became a slogan, and to get it, in 1919 Parliament created the British Electricity Commissioners. Their function was to plan a new interconnected generating system for Great Britain. In 1926 the Central Electricity Board was set up to give effect to the commissioners' plans. England and Scotland were divided into 10 electricity districts, in which a small number of stations, connected by a high tension hook-up, were to generate electric current. The high tension hook-up, known popularly as the National Grid, was built by the Central Electricity Board between 1927 and 1933. It is the property of the nation, must carry its capital charges, but may not make a profit. The grid is served by 135 selected generating stations, of which 16 are new and the rest those already in existence. These generating stations are owned by their stockholders just as they were formerly, and their dividends are guaranteed at a fixed rate. The Central Electricity Board buys electricity from the selected stations, paying for it on a scientific costing basis, and sells it to the distributing companies at cost plus expenses. Generating stations not selected to serve the grid closed down in some cases; in others they became distributing stations; and in still others they continued to generate current. If, however, their generating costs were higher than the rate at which current was supplied by the grid, they might be ordered to purchase current from the grid. The Central Electricity Board spent £27,500,000 in building the grid, and began to sell current in 1933. The load factor of the selected generating stations was raised to 80 per cent, and the cost of electricity to the distributing companies reduced to four-tenths of a penny per unit.

The impersonal statistics of the period are given reality and human values by the social survey of London made in 1929 and published in 1935, which gives intimate views of the progress made on the material side by the population of London. This study parallels an earlier survey made in 1889, so that it is possible to get not only a close-up picture, but a long view of progressive tendencies at work in Great Britain.

When Charles Booth made the first great social survey of London in 1889 he estimated that 21 shillings per week was the income necessary for a family of moderate size (two adults and three children) to satisfy the primary necessities of life. This income has been called the poverty line. In 1929, owing to price changes, the line was 40 shillings. Booth found that one-third of all the people in London were living below the poverty line. In 1929 there were 490,000 persons in the London survey area in this category out of a population of 5,653,000. This proportion is less than 10 per cent. Had the same conditions found by Booth persisted, the number of persons living in poverty in 1929 would have been over 1,500,000. Even among the unemployed, thanks to the unemployment insurance benefits, only two out of five families were below the poverty line. Another study shows that, more generally throughout England, in 1924 the proportion of families in which a man was normally earning and which were found to be in poverty was only one-fifth the proportion in 1913 if full employment was assumed. If the maximum effect of unemployment was reckoned, the proportion was still only one-half.

In 1894 there were 40 persons per thousand in London over 65 years of age. More than one in three of these aged persons was on poor relief. In 1929, with 73 persons per thousand over 65 years of age, only one in seven was on poor relief. This improvement was due to the operation of the old-age pension system. In the matter of wages and income there were great changes. In 1889 the earnings of the family of an unskilled worker were only 4 shillings, on the average, above the poverty line. In 1929 they were 17 shillings above it. In Booth's time low or sweated wages were the major cause of poverty in London. In 1929 this was no longer true. Rates of wages had gone up from 110 to 120 per cent. The cost of living had increased from 80 to 87 per cent. Real wages, in consequence, rose by 20 per cent on the average. The higher wages, moreover, were paid for shorter hours; so that an hour's labor was paid at half again as much in 1929, measured in terms of the purchase of commodities, as in 1889.

The average wage of a male adult in 1929 in the London area was 63 shillings for a full week's work. More than half the males received over 60 shillings, and more than a tenth received more than £4 (80 shillings). Because other members of the family beside the father worked, the family income of London work-

ingmen averaged 80 shillings per week with a "median" or "middle rate" of 71 shillings. Two-thirds of all working-class families had a margin of 19 shillings above their minimum needs. "This," says the survey, "is a striking illustration of the material advance since the time of the Booth survey, when two-thirds included the whole of the population above the poverty line." Unemployment, incidentally, now replaced low wages as the major cause of poverty. For while wages were higher, unemployment in the postwar period was more severe than it had been earlier. There was, moreover, a wide fluctuation in wages, ranging from 43s. 6d. per week to £4 per week for the pay of an adult man. The lowest-paid tenth of the workers of London were unquestionably still living in poverty if they were trying to live off the earnings of the head of the family exclusively.

Apart from wages and earnings, there were many other indications of increased well-being in the London of 1929 as compared with the London of 1889. Crimes of violence had decreased steadily, and crimes against property were on the decline. Cases of drunkenness dropped from 5824 to 3814 a year. The consumption of beer decreased from 46 to 23 standard gallons per head per annum.

Overcrowding of the people was a marked feature of London life in 1889, and the situation was worse in 1919. Between 1920 and 1929 new houses were built to accommodate 800,000 persons in the London area. Although money rents rose in the interval, the level of rents as related to income fell. Parks, squares, and open spaces increased from 6589 acres in 1891 to 9627 acres in 1928. In London as a whole there were 168 acres of parks for every 100,000 people. In Shoreditch, however, there were still, in 1929, less than 9 acres per 100,000 people. Transport facilities for the population improved greatly. The horse omnibus was replaced by the motorbus, the system of undergrounds was greatly extended, and the cheap tramway lines were built. At the same time the risks of being killed in traffic were much increased, so that in 1929 they were double what they had been in 1922.

Striking evidence of social betterment is provided by the record of improvement in public health, which is perhaps the best single test of a people's well-being. Here there is one outstanding fact. The death rate in the last four years of the survey period (1924-

1928) was less than two-thirds of the rate during the first four years (1890-1894). To this advance medicine, health insurance, and better sanitation made great contributions. Even greater were those made by better housing, more food, decent clothing, more leisure, and all the other things that are generally thought of when the phrase "higher standards of living" is used. Man does not live by bread alone: but in this life, at least, a minimum of material goods is necessary to health, which is an essential basis of a good and happy life.

Taken by and large the progress of the forty-year period from 1889 to 1929, as this is illustrated by what happened in the London area, was extremely slow down to 1914. The war stimulated change. This statement must not be read as an assertion that war is in general a beneficent institution. The fact is merely that along with its vast evils the first World War assisted in social progress. Most of what was gained was gained as a result of forces set in motion earlier than the decade from 1919 to 1929. The postwar decade with all its maladjustments is one of the greatest eras in British history.

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Chapter 30

THE DEPARTURE FROM FREE TRADE

IN OCTOBER, 1929, the New York stock market collapsed after the wildest speculative orgy in American history. This collapse was not the cause, but the symptom, of the beginning of a great business depression which extended its effects all over the world. Its causes were in part financial and industrial and in part political. As a result of the experiences of the war, many nations hitherto primarily agricultural had embarked upon a policy of building up their industrial systems with tariff aid. In consequence British (and other) exports to those countries, particularly in central Europe, were reduced. As a result of the reparations and interallied war debt questions, financial operations of great magnitude were carried through which had the effect of disorganizing the "normal" course of world trade to the advantage of the United States and to the disadvantage of Great Britain. More important still, there had been an extraordinary amount of building beyond immediate needs everywhere, largely on borrowed funds which were lost when the buildings failed to be rented at adequate rents. In all countries there had been much new factory building. The newer industrial units were frequently so much superior to the older plants that these were forced into bankruptcy because of their inability to compete. Finally there had come a revolution in agriculture, particularly in America and in the colonial areas of the world, through the introduction of tractors and farm machinery and the more extensive use of fertilizers, which increased the output of agricultural products seeking British and European markets. At the same time changes in eating habits in Europe, perhaps as a result of war-time experiences, had led to the adoption of lighter diets by European peoples. With

increased supplies and reduced demands, the prices of agricultural products fell. Many farmers throughout the world who had bought land at inflated values on mortgages found themselves unable to pay their interest and defaulted. At the same time they disappeared from the world market as consumers of imported goods.

The superstructure of industrial and agricultural developments during the 1920's had been built up on the basis of borrowed funds, and the payment of agreed interest charges was dependent upon the maintenance of existing price levels. Should the price level fall it might be impossible for an apartment house, a farm, or a factory to meet its interest charges, and it would then pass from its "owner" into the hands of those who had provided the loan. The irony of the situation was that in view of the increased production which the work of the 1920's entailed it was impossible to maintain the postwar price levels. In 1926 economists noticed that prices were beginning to decline. When, in 1929, they fell rapidly, the depression was under way.

The depression was accentuated in 1931 by a curious financial situation which had been developed by British, French, American, and German bankers. French and American houses had advanced large sums to English banks, which in turn loaned the money at slightly higher rates to German concerns. In the summer of 1931 the American and French bankers began to call in their loans. Since the British could not get their money back from Germany, they were forced to deplete their own gold reserves to make repayment to Paris and New York. The "threat to the pound sterling" thus created brought about a major political crisis. The Labor government headed by Ramsay MacDonald resigned and was replaced by a National Coalition government headed by MacDonald. It was composed primarily of Conservatives with Liberal and some Labor elements, with the majority of the Labor members in the opposition.

Within a few years of the outbreak of the depression, Great Britain, in common with the rest of Europe, found herself concerned with a new social policy, compounded of equal parts of mass democracy, the unemployment of men, plant, and capital, and the dread of insecurity and the loss of jobs and income on the one hand and the response of statesmen eager to do their little best to help those whose votes could dethrone them on

the other. Englishmen used the phrase neo-mercantilism to designate the new evangelism. Indeed the new economic policy resembled eighteenth-century mercantilism in many ways, particularly in its emphasis upon the self-sufficiency of the nation and even of the empire in supply, production, and exchange. Europeans, harking back to their schoolboy study of Greek, used the term *autarchy* to emphasize the fact that the resemblances to the eighteenth century were less significant than the novelties, at least of operation, of the new order.

Basically autarchy implied the entire abandonment of the old concepts of free trade, grounded on the notion that every man, working for himself, buying in the cheapest and selling in the dearest market, and seeking the greatest profit in free competition with everybody else, was bound in the long run not only to do the best possible thing for himself but also to contribute most to the social advantage. In the new deal, motivated planning was to replace the haphazard working out of individual choice, free enterprise, and competitive bargaining. The planning was to be the function of the whole social group in its corporate capacity of the state. This means, of course, in practice that in each industry a small group of technicians, vested with the power of the government, were to make plans and work out the rules under which business was to be carried on with a view to keeping the weaker brethren in business, insuring markets, especially at the expense of the foreigner, and maintaining employment.

For many years Englishmen had experienced a certain amount of interference from the government in their business. They had been protected and assisted by the social services of the state. Free trade had already before the war been somewhat restricted by unemployment insurance, minimum wage regulations, workmen's compensation laws, railroad rate limitations, and other social reform measures. Now in the 1930's Englishmen adopted parts of the new gospel of economic salvation. Yet they did not do so as enthusiastically and eagerly as did the Germans, Italians, and Russians; they never really admitted their conversion. Perhaps it would be most correct to say that they still continued to go to the old church and did not even pull down the signboard from the house of free capitalist enterprise. They merely interpolated into the free trade bible certain selected passages from the book of the teachings of the doctors of the collectivist society.

Thus in true British fashion they compromised between the past and present, having the best of both worlds, without the disadvantages of the one or the excesses of the other.

As men looked at what they thought was the ruin of their hopes amidst the financial collapse, unemployment, and trade recession of the years from 1929 to 1932, they concluded that among the major difficulties which faced the world was the ending of the period of expansion or at least the slowing down of the rate of expansion, which had hitherto provided maximal opportunities for the investment of profits. In the prewar period rapid growth, especially through the development of the various colonial areas of the world, in Africa, North and South America, and Asia had meant a steadily augmenting demand for the basic products of British industry, such as coal, iron and steel, and textiles. In the past it only seemed necessary to know that demand was going to be larger than it had been last year and go ahead. Now it looked as though demand would be smaller from year to year, at least for the British producer of those staple wares which entered world trade.

The search for profitable investment opportunities had accentuated competition for markets. When a particular industry was making a good profit men put their capital into new factories in this line with the result that in the bidding for business the more poorly equipped factories were forced out of operation, with great losses both to their owners and their operatives. The question of demand was rendered unstable in other branches of production by the growing proportion of wage-earning adults among the world's people, who, after minimal requirements of diet were satisfied, had a larger share of income available with which to do as they pleased. This week they might go to the movies and next week they might buy gasoline, new tires, or an album of phonograph records.

Second in importance to the ending of the steady expansion of production as an element in the British inclination away from free trade was the recognition, brought to a focus by the first World War, that nations which could not produce all their major requirements within their own borders were at a disadvantage. Shortages of essential goods in times of crisis might bring on defeat. Nearly every nation in Europe, as already noted, adopted "self-sufficient" policies after 1918, limiting imports in order to

encourage and stimulate home production of foodstuffs, minerals, and manufactured goods. To protect the capitalists and workers who thus so zealously worked for the national interest as to endanger their own security by bringing about much lower prices, the free markets for foreign goods were closed. This process reacted with particular severity upon the British manufacturers who had supplied many foreign countries with their manufactured goods. Even where markets remained open, the low prices of agricultural products which prevailed made it hard for the people to buy in their former volume.

In the past the maladjustments of production and consumption had been cured by the operation of the self-adjusting price mechanism. The cure was certain, but it took years, and in the process the weaker capitalist and worker groups suffered severely. The masses of the world now showed impatience with the price system as a means of deciding their fate. They began to insist that consumers, at least within the boundaries of their own nations, must not be permitted to refuse their goods merely because they were dearer or poorer in quality than those produced elsewhere. Since the masses now voted, it was no longer good political and social sense to permit them to be exposed to the merciless operation of the law of supply and demand. As Ramsay MacDonald, prime minister of Great Britain, put the matter, British citizens could no longer be regarded as ballast to be thrown overboard to lighten the ship when the storms came.

These different factors were to be found in varying proportions in various countries as the flush decade of the 1920's approached its end. In Great Britain, as elsewhere, they fused their effects to discount free trade and laissez-faire. It was no longer fashionable to believe that buying in the cheapest, and selling in the dearest market would bring maximal social advantages. Laissez-faire might bring the greatest wealth to certain individuals, but it was now seen that the unrestrained operation of the forces of competition had the effect of exposing the masses of those who were less well endowed physically and mentally, or less well trained, or who lived on poorer soils, to the certainty of poverty and unemployment in times of strain. The rallying cry of the good life for all and national security competed with the profit motive as the social impulse of economic life. In this way social

planning became necessary, at least in certain fields of economic endeavor, as a substitute for *laissez-faire*.

The notion that the good life for all (or nearly all) was more important than maximum profits for a few, especially since these could no longer find satisfactory investments, was reinforced by certain changes growing out of the very nature of the existing social and economic set-up which made for the acceptance of the idea that in the future economic development must be planned instead of being allowed to proceed in its own way. The increased size of industrial units, for example, made for inflexibility. Small factories could bid on orders and deliver the goods before some of the great plants could get the cost data past the business officers. The building of duplicate plant facilities in other countries and the reduction of export trade made for a good deal of redundant plant capacity. Limitations on size and the reduction of the number of factories to conform with the demand for goods could be effected only by planning enforced by the power of the state. The net result of all these considerations was that social planning in detail was adopted, but no complete program was ever accepted.

The advocates of social planning in England ran the whole gamut from Moscow to Rome; and among them was to be found every variety of special scheme, from token money, nationalized credit, protective tariffs, and the control of potato planting to making work by tearing down half of London and all of Manchester and rebuilding them. This last was the brilliant idea of G. Bernard Shaw. Yet even so sane an economist as Maynard Keynes was willing to go as far as rebuilding half of London.

In testing the measures which it adopted, the British government seems to have used one criterion, namely, their reaction on British foreign trade. Because, for example, increased taxation would tend to raise industrial costs and so impede recovery in the export trade, the government tried to keep its monetary outlays down to a minimum. Until the necessity for rearmament could no longer be avoided in 1935, 1936, and 1937, the national budget was kept down in remarkable fashion. In the five years ending in 1929 the average budget expenditures were about £750,000,000, with a general tendency upward. In these years large sums were spent on housing subsidies. The subsidy to the coal-mining industry in 1925-1926 took £23,000,000, and augmenting contribu-

tions were made to local governments, to agriculture, and for police purposes. The rise in revenue not derived from taxes, from £59,000,000 to £94,000,000 a year, kept taxation from being increased.

In the first five depression years, 1929-1934, the average expenditures of the British government were exactly the same as in the preceding years. In 1930-1931 there was a new high of £799,000,000, offset by a low, in 1933-1934, of £690,000,000. Since non-tax revenue fell, it was necessary to increase taxation. The high of £799,000,000 of 1930-1931 was due to a new expenditure of £5,000,000 for education, extra contributions of £23,000,000 for the social services, and large grants to the local governments to compensate them for lowering the rates or local taxes on agricultural land, railways, and industrial properties. When it was discovered in 1931 that the revenue yields for the current year would not be up to expectations and that large supplemental deficiencies for the social services, the road fund, and for the relief of unemployment were accumulating, the cry for economy was raised. To prevent a deficit of £119,000,000, a supplementary budget in September, 1931, cut expenditures and raised taxes. Outlays in 1931-1932 were, in consequence, £28,000,000 below the preceding year, and those of 1932-1933, amounting to £690,000,000, were the lowest in many years. One of the most important items in the economies effected was the elimination from the budget of payments of installments on the war debt due to the United States.

Unemployment Relief

From the political standpoint the handling of unemployment was the most pressing problem of the early depression years. A Labor government headed by Ramsay MacDonald had taken office just before the crisis of 1929 broke. In July, 1929, the number of unemployed was 1,100,000 persons. Most of these were being provided for by the unemployment insurance scheme, with some assistance from private charity and from the poor law authorities. By January, 1930, over 2,000,000 persons were out of work, and the number mounted rapidly to 3,000,000. The government at once announced a dual program: maintenance of the unemployed and the restoration of prosperity.

To deal with the problem of maintenance, the government continued to rely upon the unemployment insurance scheme coupled with small advances and easy credit arrangements, backed by grants of powers, to local authorities and to private enterprises to carry through remedial improvements. The maintenance, moreover, was intended to be fairly adequate. As covenanted benefits, those to which insured persons were entitled under the scheme, were exhausted, repeated extensions of uncovenanted benefits beyond the covenanted terms were authorized. For those who could not meet the minimal requirements for receiving benefits, transitional benefits were arranged. Thus the unemployment insurance scheme ceased to be an insurance arrangement and became a system of relief supported by workers who still had jobs, employers whose factories still ran, and the state, with the deficits covered by loans. Until the loans became so large as to terrify the public officials of a day not used to thinking in really big figures, the procedure was both satisfactory and relatively cheap, at least to the public treasury.

In the summer of 1931 the government suddenly became alarmed at the prospect of the mounting debt of the insurance fund, which was being increased at the rate of over £1,000,000 a week. The cabinet was also concerned with the heavy withdrawals of gold from the Bank of England by French and American interests. Loans in Paris and New York to protect the gold reserve were linked up with a radical economy program. This cut benefits and raised premiums for insured workers. Transitional benefits were in the future to be paid from the Exchequer rather than from the insurance fund, and to make certain that these would be kept at a minimum a "means test" was devised, making family need rather than individual unemployment the basis for any but covenanted benefits. In 1934 a separation was made between insurance benefits, paid on an actuarial basis in the event of unemployment on the part of persons entitled to receive them in proportion to premiums paid, and "public assistance," a new euphemistic term for poor relief. The scale of benefits as it existed in early 1931 was restored for those meeting the requirements of the insurance scheme, as long as they did. The "superfluous scrap," to use the language of the now ex-socialist prime minister, Ramsay MacDonald, were placed under the charge of Unemployment Assistance Committees, appointed

by the Ministry of Labour. For severity and harshness the Unemployment Assistance Committees soon made an unenviable reputation. Owing to unsatisfactory experiences with state assistance to public works during the 1920's there was little new recourse to this method of providing men with work or of stimulating industrial activity by pump-priming. It was estimated that never more than 110,000 men had been put to work at one time on state-assisted public works. In 1933 MacDonald definitely announced that the policy of dealing with unemployment by state assistance to public works was to be abandoned altogether. Something was still hoped for from local public works and new housing projects, but these were to be financed without government subsidies.

The Abandonment of the Gold Standard

After providing maintenance for the unemployed, the various British cabinets after 1929 promised to restore prosperity. Their first important move to effect this purpose was made in September, 1931, when the National Government, then in power, abandoned the gold standard, by authorizing the Bank of England to cease redeeming its notes in gold. The return to the gold standard in 1925 had led to an "overvaluation" of the pound sterling; the cutting loose from gold, it was believed, would lower pound sterling prices in the export markets so much in terms of local currencies that foreigners would again buy British products. In the United States the pound sterling sank from about \$5.00 in value to a little more than \$3.00. Wedgwood bone china dinner plates, to give one example of the effect of this change, which had previously sold in American shops for \$5.00 each or \$60.00 a dozen were reduced to \$3.50 each or \$42.00 a dozen. Some who championed the return to paper felt that the change would reduce real wages which actually were rising in purchasing power owing to the general fall of prices since 1926 and 1929. The cost of living (on the basis of 100 in 1914) was 160-170 in 1929; in 1934 it was 135-145. Wages were 174 in 1929 and were still 174 in 1934. The reduction of wages by the change-over from gold misfired, and so did the hoped-for stimulation of foreign trade. Some of Great Britain's best customers at once abandoned gold also, so that the prices of British goods in their markets remained the

same. One of her greatest competitors, Japan, cut her currency in foreign exchange even below the value of the new pound. The United States also went off the gold standard. As far as Great Britain's foreign trade was concerned, she might just as well have stayed on gold. On the other hand, her action in leaving gold did much to relieve her banking and credit position which was being endangered by the gold-hoarding policies of the United States and France. While American banks failed by the hundreds in 1932 and 1933, not a single English bank closed its doors.

The Tariff of 1931-1932

Following the abandonment of the gold standard, the National Government appealed for and received in a general election a doctor's mandate to do anything which it felt necessary to restore economic health. To this end the National Government adopted a protective tariff. After nearly thirty years of agitation on the part of the tariff reformers England formally deserted free trade. The new tariff was designed primarily to curb the flood of imports which, it was believed, were threatening that sacred mystery, the balance of trade. The "unsheltered" industries, those worst off in the face of world competition (often because they had not been kept up to date) were given something to cover their nakedness. Revenue would be forthcoming from a new source. It was believed, moreover, that the tariff could be used to tie the empire more closely together, since Great Britain could now give to the dominions preferential reductions from the tariff schedules, which might forestall a tendency in some dominions to treat British goods on almost the same basis as those of other nations. Finally, it was argued that the tariff could be used to influence foreign high protective states, such as Germany and France, to reduce their tariff schedules in return for the concessions which Great Britain could now offer. As actually worked out, the main function of the tariff was to aid the "unsheltered" industries, such as steel, which had its record year for all time in 1935, and to assist agriculture, which, with the exception of the war years, had been a worthy applicant for relief ever since the middle seventies of the past century.

The preliminary tariff which was adopted in the fall of 1931 empowered the government to levy duties of as much as 100 per

cent on manufactured goods imported. Because many of the Conservative majority were still reluctant to tax the people's food, wheat imports were kept on the free list, with a pledge of other measures of assistance to grain farming. In actual practice the government did not avail itself of its full powers and levied duties of only 50 per cent on imported goods, and these were not applied to dominion products. Since experience soon showed that duties at even this rate stifled trade, the definitive tariff of February, 1932, provided for a 10 per cent imposition on all goods imported except raw cotton, wool, meat, fish, and wheat. In April, 1932, the rates were raised on imported manufactured articles. At an imperial conference held at Ottawa mutual exchanges of tariff reductions between Great Britain and her dominions were arranged, with Great Britain making most of the concessions.

British Agriculture and Economic Planning

Since British agriculture suffered especially from the changes of the recent past, it seemed only right to the farming classes that special attention should be paid to their needs in various kinds of measures in addition to the tariff. Agriculturalists argued that they had been exposed to the competition of North and South America, Australia, and Africa ever since the middle 1870's and that since little had been done in their behalf in the past two generations it was all the more just that they be protected from the new lower levels of world prices of agricultural products. There was much talk about the planned economy in agriculture and its social value for the nation in connection with the various arrangements which were actually sanctioned by the government. In fact, it is the special schemes in aid of agricultural resuscitation that comprise the larger part of the applications of the idea of a planned economy in Great Britain.

Apart from the general technological changes in agriculture which brought about all over the world serious increases in the supply of food at the very time when changes in diet reduced consumption in many countries, British farming suffered from certain peculiar burdens. The small size of the British farming unit precluded certain economies attending the use of heavy machinery. The social stigmata attaching to labor forced the farmer and his family to resort to a greater percentage of hired labor than was

found in other countries. The proportion was said to be three hired laborers to one farmer. Actually it was 227 to 100. Although the living standards of the farm laborers were and still are unduly low, the extension in 1925 of the Trades Board Act to their advantage resulted in sharp increases in the farmers' wages bill. Agricultural wages were raised from a minimum of 17 shillings or 20 shillings a week to a minimum of 30 shillings per week.

Farm production costs in England were unduly high in comparison with certain other countries and could not be reduced. Under laissez-faire principles the policy was to let the whole industry go to the wall and those engaged in it seek other work, if cheaper food could be purchased elsewhere. But farming still remained the largest single British industry, and the farmer, the laborer, and the landowner did not want to go to the wall. They represented an industry of vital necessity in time of war, should any enemy succeed in endangering the shipment of food from abroad. Moreover, they all voted.

Since the urban proletariat, likewise all voters, steadily resented any planned increase in the cost of their food, even when spread with such jam as self-sufficiency and the United Empire, the only way out was to raise the prices of farm products by indirection, to give subsidies to growers, or to reduce the costs of marketing, credit, and other incidental production costs through cooperation. Something was done along all these lines. In order to make any scheme effective, compulsion exerted by the state upon all producers to join it was a necessary element.

To cheapen the cost of credit to farmers the Agricultural Mortgage Corporation was set up in 1928 with capital subscribed by the banks under a government guarantee. Advances for sixty-five years were to be made for the purchase of farms up to two-fifths of their value. Short-term credits might be provided on the security of growing crops and other assets. In certain cases subsidies were paid to growers of special crops. Thus from 1925 to 1935 beetroot farmers were given a direct subsidy from the Exchequer. British beef was accorded a guaranteed price, with deficiencies to be made good out of the Exchequer.

The more general application of the planned economy took the form of special arrangements for various kinds of crops, introduced under the terms of the Agricultural Marketing Acts of 1931 and 1933. Most of these schemes seem, on closer inspection, to have

conceived the good of all and the national advantage in terms of higher prices for farm products. This is somewhat disguised by frequent assertions of the necessity of considering the interests of the consumers. Once a scheme was authorized, however, the consumer was given no breaks. Typical of many arrangements of this sort were the Wheat Quota Scheme, the Potato Scheme, and the Milk Marketing Scheme, which provide interesting material for the study of the planned economy in practice.

The Wheat Quota Scheme

During the war, as a war measure, agriculture had been given certain guaranteed prices under the Corn Production Act of 1917. This act was limited to a life of five years and came to an end in 1922. In 1920 the principle of guaranteed prices for agricultural products in peace times, based on the cost of production, was written into law in the Agricultural Act of that year, but in view of the expected burdens of the measure on the Exchequer, it was repealed within the year. The farmers, feeling cheated, never ceased their clamor for help, and during the years which followed many different ideas were put forward. Of these one, known as the Quota Scheme, was particularly popular in farming circles. It aimed to limit the imports of foodstuffs to a certain percentage of the volume consumed in Great Britain. In 1932, when the politicians, afraid to give tariff protection to wheat, were goaded into doing something to help the wheat farmer (and his landlord too), they associated the name of the Wheat Quota Scheme with a measure which was not a quota device at all, but a processing tax arrangement with provision for a guaranteed price for a statutory maximum amount of wheat. The Wheat Act of 1932, popularly spoken of as the Wheat Quota Act, provided that all wheat growers must register and certify their sales of wheat to the wheat commissioner, together with the prices received. A standard price of 10s. per hundredweight was set up. At the end of the year all sales prices were averaged up. If the average figure was less than 10s. per hundredweight, each grower was to receive the difference between the average and 10s. multiplied by the quantity of his sales. The sums thus to be distributed were to be derived from a processing tax on all flour delivered for consumption in the United Kingdom. If the production for the year

were to be in excess of a standard quantity to be fixed by the Minister of Agriculture, the deficiency payments were to be reduced fractionally.

The Potato Scheme

Potatoes were brought under the protection of the new tariff duties of 1931 and 1932. Empire potatoes, except those from Ireland, were exempted from the levies. In the later months of 1933 further protection was given to British potatoes by agreements negotiated by the government with the Netherlands, Belgium, and the Irish Free State for the restriction of shipments to Great Britain. In 1933, further, a Potato Marketing Scheme was set up "to stabilize output at the quantity desired by the consumer." This phrase was intended to mean at such prices as the growers thought proper. The operation of the scheme was simplicity itself. All growers were compelled to register with the Potato Board, which administered the scheme. No distributor might buy except under the terms of the act. The acreage to be sown was fixed by the Board on the basis of the average acreage during the past three seasons. Actually, the stipulated area for 1934, the first year of the scheme, was 6 per cent less than that planted in 1933. Seasonal variations in the crop were counteracted by the simple device of changing the size of the riddle or screen over which the potatoes were passed to remove dust and tubers too small to enter trade. If the crop were too abundant the screen size was to be made larger. No potato which passed through the riddle was permitted to be sold, but had to be fed to stock or converted into starch. Extensions of acreage and admissions of new growers were permitted upon payment of a fine of £5 per acre.

The Milk Marketing Scheme

Dairying is one of the most important branches of British agriculture, surpassed only by cattle-feeding for beef. In dairying the main troubles of the farmer grew out of the competition for the liquid milk market between those herdsmen who produced milk chiefly for making cheese and butter with those who produced it altogether for liquid consumption. The price of the milk intended

for cheese and butter-making was so low that there was every temptation for its producers to cut into the more highly priced market whenever possible. A second difficulty in the dairying industry lay in the fact that the farmers were relatively poorly collectivized in their bargaining powers in comparison with the powerful milk distributing companies.

In 1931 and 1932 milk was given a certain amount of tariff protection. Dominion milk was admitted for three years without duty, but foreign milk paid from 10 to 15 per cent *ad valorem* and Irish milk and cream were subjected to a special duty of 30 per cent. In 1934 agreements were made with foreign countries to secure a voluntary restriction on the amount of condensed and powdered milk which they sent to Great Britain.

More important still, in October, 1933, the Milk Marketing Board was set up "to secure prosperity for all concerned with adequate safeguards for the consumers, to maintain prices, improve quality, regulate supply, and stimulate demand." To do all this it was planned to give the producer of milk intended for the manufacture of butter and cheese a better price, so that he would not be tempted to chisel in on the liquid milk market by offering milk at lower prices than those which prevailed there.

Under a Central Milk Marketing Board England was divided into eleven regions, in each of which a local committee supervised regional arrangements. Both the central and the local boards were chosen by the producers. All producers of milk, except those not keeping more than four cows and not selling milk at retail or those who did not sell milk at all or only to their own servants, were compelled to register with the scheme. Only registered producers were permitted to deal in milk.

Prices of liquid milk were fixed in each region by negotiation between the producers and distributors. Rebates from this price were allowed in the case of milk used in manufacturing. By means of a tripartite contract all milk sold off the farm became the legal property of the Central Marketing Board. A monthly report of all milk shipped was made to the board and all payments from distributors or manufacturers accrued to it and were credited by it to the regional pool of the district in which the milk originated. The board calculated the "regional pool price" for the month, based on the relative quantities of milk used as liquid milk and for manufacturing together with the rebates allowed. This

regional pool price was the basic price paid to producers regardless of how the milk was used; but this base price was subjected to certain additions and deductions. First there was deducted an interregional compensation levy imposed on all liquid milk sales to equalize the prices in regions where the amount used in manufacture was high as over against those where the amount was low. This levy was a kind of subsidy paid by milk sold in the liquid milk market to milk used in manufacturing. There were also premiums to be added to the base price, such as those for quality, service, and delivery. Producers who retailed their own milk were comprehended within the scheme to the extent that they were compelled to register, submit reports of production and sales, pay assessments thereon to regional pools, and maintain prevailing prices. The government guaranteed to the board a minimum price of five pence per gallon in summer and six pence per gallon in winter for all milk used for manufacturing in factories. Deficiencies were to be made good out of the Exchequer as a repayable loan. The government also advanced £750,000 a year for four years to conduct a campaign for better milk, and £500,000 on a pound-for-pound basis, to educate the public to the greater use of milk. Milk bars which sprang up in the English towns were one aspect of this drive.

In agriculture, generally speaking, in any line in which 66 per cent of the producers petitioned for a marketing scheme, a plan was drawn up by the Ministry of Agriculture and submitted to Parliament for final authorization. When approved the scheme was compulsory upon all producers of the commodity in question, operating in accordance with the examples just given.

Industry and Economic Planning

Possibly because of the tradition in British industry of intense individualism and long adherence to the doctrines of free trade, it proved to be relatively more difficult in industry than in agriculture to perfect arrangements for controlling prices and for dealing with the problem of redundant plant capacity. The stronger companies feared that any gains made by weaker concerns must be at their expense.

While there was a market for all that England could grow, there was no market for much that England could make. Manu-

facturers were reluctant to recognize this basic fact and consequently refused to admit the necessity for what was called "the organization of decay." They did not want to admit that production was potentially too great for the market and that if the sanctity of profits prevented the growth of the market, the only device left was the restriction of production, the "adjustment of wealth to poverty." Yet the chancellor of the Exchequer, speaking in the House of Commons on June 2, 1932, declared that "to allow production to go on unchecked and unregulated in these modern conditions when it could almost at a moment's notice be increased to an almost indefinite extent was absolute folly." The *Economist*, too, conceded what the ordinary manufacturer hesitated to put into words in its reference to "the readjustment of productive capacity to the lower level of demand for consumer's goods." "Readjustment" might seem fantastic from the angle of common sense, but in a world in which markets were closed by trade barriers of all sorts it was necessary for the survival of the capitalist system. It was the only alternative that men could think of to the restoration of markets and the reinstitution of world free trade, which in view of the developments since 1919 seemed impossible. Readjustment must therefore be carried through as the industrial manifestation of the planned economy.

In certain trades, where productive capacity was most in excess of needs, voluntary associations were formed among the manufacturers to buy up and destroy redundant plants and machinery. The Woolcombers' Mutual Association Ltd. was organized in 1933 to purchase and dismantle obsolete mills and arrange that their machinery and buildings should never again be used for woolcombing. The amount of idle shipping was reduced from 3,610,000 tons in June, 1932, to 1,720,000 tons in June, 1934, by a vigorous policy of scrapping or selling to foreign buyers. To keep shipping up to date a subsidy was granted for the building of new ships, if for each ton of new work two tons of old ships were broken up. In 1930 the National Shipbuilders Security Ltd. was formed under an agreement to pay a levy of 1 per cent on the contract price of all ships built until the loans were redeemed, to buy up idle yards and even entire companies, to sell the land, dismantle the equipment, and arrange not to use the land for shipbuilding for certain terms of years. By the end of 1937, 137 ship berths of 1,000,000 tons capacity had been bought up and

scrapped. On the Tyne 8 out of 14 yards were closed. Yet of the 6 that were left only 4 were at work.

In 1936 the Cotton Spinning Act came into operation to deal with redundant spindles, with levies made upon the individual mills amounting to about £500 a year in the case of one of average size. Price-fixing schemes were also used to stabilize the cotton-spinning trade.

In the coal-mining industry a most elaborate set of arrangements was worked out under government auspices to readjust the industry to a diminished market and lower world prices. The various measures were embodied in the Coal Mines Acts of 1930 and 1938. They provided for the purchase and administration by the state of coal royalties. Companies were to be compulsorily amalgamated. Districts were set up in which quota systems and selling schemes were to be worked out to fix the output of the various coal-mining companies and to establish the minimum prices at which the various grades of coal could be sold. Between 1936 and 1938 central selling schemes came into operation, but so reluctant were the various coal-mining operators to submit to the planned economy that in only one district, that of Lancashire, was the district board entrusted with complete control of output and prices. In the other districts a number of sales committees received delegations of power from the district central boards authorizing them to regulate output and prices piecemeal. Another illustration of the difficulty of rationalizing the coal industry is seen in the fact that it was not until 1938 that the government could prepare a law which was acceptable to the industry.

There were many other schemes besides those which have just been described. The years 1933 and 1934 saw the greatest activity in introducing planning arrangements, but the final Coal Mines Act was not passed until 1938, and this is the date also of the Sea Fish Act, compelling all producers and dealers in fish to register as a preliminary to the introduction of a marketing scheme to restrict production and raise prices. Before the act was passed the Grimsby and Hull trawler owners had already agreed among themselves to withdraw 20 per cent of their distance trawlers from service to cut excessive supplies of fish. Some of the marketing schemes, such as the Potato Marketing Scheme, functioned well from the beginning and were renewed as the period for which they were originally authorized came to an end. Other measures, like

the Pig and Bacon Scheme, did not work satisfactorily and at times were suspended. In 1938, in the new pig and bacon bills, the government guaranteed a basic price for pigs to vary only with the cost of feeding stuffs and established a fixed margin between pig prices and bacon prices. The Milk Marketing Scheme met a good deal of criticism which resulted in the appointment of a Milk Reorganization Committee, which recommended a permanent Milk Commission appointed by the government to fix prices. So difficult was this matter that the government introduced and then withdrew a new milk bill in 1938. Some agriculturalists, like the egg producers and the doughty Scottish raspberry growers, refused to accept schemes at all and rejected those prepared for them by the Ministry of Agriculture.

There was a tendency during the decade of the 1930's to extend the grant of direct government subsidies. In 1936 the government announced that as a long-term policy it was prepared to grant a subsidy of a maximum of £5,000,000 a year to stimulate the production of quality beef. During 1937 the government announced further aid to agriculture to make the country self-sufficient in time of war. To increase the fertility of the land and to stimulate the production of cereals the state announced subsidies to reduce the price of basic slag. Grants were made for land drainage, and experiments with grass drying were undertaken. The Wheat Act was revised so as to cover 36,000,000 instead of 27,000,000 hundredweight of millable wheat, and the principle of the wheat subsidy was extended to barley and oats when prices fell below certain levels. The barley and oats subsidies were to be borne entirely by the Exchequer and not by the consumer in the form of processing tax. In 1938 because of low prices the barley and oats subsidies were doubled. To maintain lamb and mutton prices, imports of these meats were placed under the Empire Beef Council to begin in January, 1939. Over against all this nursing by the state of industry and agriculture must be set the fact that private initiative still functioned. By 1938 two-thirds of the blast furnaces existing in 1936 had been replaced by modern plants. In 1938 (only about two decades behind the United States and Germany), the first continuous sheet steel mill in Great Britain was completed at Ebbw Vale.

The whole idea of a planned society inherent in the various measures described above was emphatically rejected by the logi-

cians of the London School of Economics, who kept proving to their own satisfaction that all that was needed to keep the capitalist system going was the cessation of government interference with the free operation of the price system. These very influential economists held that the price system would soon have restored the temporarily disturbed conditions caused by the presence of a huge apparatus of mechanical equipment built during the war for which there was no peacetime need. Yet adaptation to peacetime conditions by the price system was rendered impossible because the old flexibility of response to changed circumstances had been destroyed by the grouping of industries into great combinations during the war, the authoritarian fixing of prices and wages, and the imposition of habits of collective bargaining. Excess plants which would have been weeded out by healthy bankruptcy continued to operate (at a loss to their stockholders who always thought next year would see a turn) and wages which would have responded to the market remained too high. The high tariff systems of other nations bitten by the bug of self-sufficiency disrupted the open market for British goods outside the empire and even in it, and restricted the area in which subdivision of labor found scope. The instability of the exchanges, to which considerable contributions were made by the United States policy of collecting war debts and refusing to take goods freely in payment and by the allied policy of collecting reparations and refusing to take anything but gold, created differences between internal and external values of money and further distorted the course of trade.

Social policy, that is governmental action outside the limits laid down by the laissez-faire liberals of the nineteenth century, was the villain in the piece of these economists. Led by Sir William Beveridge and Professor L. C. Robbins they insisted that if capitalism were freed of its shackles, if obstructions to international trade were removed, if restrictive schemes and monopolies were abandoned, and if even wages were left to find their own level, relieved of the influence of trade unions and of the unemployment insurance scheme, things would be well.

The logic of these economists of the London School of Economics was inescapable, once their premises were granted; but the difficulty with their view was that other nations were not prepared to abandon their restrictive and self-sufficient policies. Laissez-

faire seemed to be at an end, and the free market, in which it functioned could not soon be restored. More fundamentally destructive of the laissez-faire idea was the objection that profits were not the only end of business; and even if they were, the constant expansion of industry and business which alone provided profits with maximum investment opportunities was a thing of the past. This was the view of those thinkers who held that the end of economic activity was the good life for all.

If a statement were requested of the contributions made by the various social planning arrangements toward ending the depression, it would be difficult to give a clear reply. In general they tided over businessmen and workers at the expense of the future. By keeping prices up and output down they prevented such a rapid weeding out of the weakest elements in the ranks both of capitalist employers and of workers that the result would have been regarded as a social cataclysm. Inherent in the whole idea of the planned economy was the notion that the nation, whether Great Britain, Italy, Germany, or Russia, must be the area in which it was applied. As a result nationalism was emphasized and national rivalries intensified. At the moment of writing all and more than all that was gained lies in the abyss of war to which national rivalries have brought the great nations of Europe.

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Chapter 31

THE SECOND WORLD WAR

WHEN the war started in the late summer of 1939, a continuing improvement in the living standards of the people represented the goal of English social and economic policy. This ideal was replaced almost over night by the purpose of devoting the national resources to military uses, without depressing the standard of living below the level of subsistence. A change-over from a peace to a war economy was frankly recognized as a necessary element in waging and winning the war.

For some time before the outbreak of the war, the proportion of British manpower and British machinery which was devoted to defense work was steadily mounting. A British rearmament program, costing £1,500,000,000, had been adopted in 1937 and this was being carried out at an accelerated tempo.

During the year 1938, as a result of the disturbed state of European politics, all sorts of plans had been perfected for putting England upon a war footing. During August and September, 1939, these were given the force of law and put into operation by a series of enactments and orders in council. The Emergency Powers (Defence) Act of August 24, 1939, authorized the government to issue regulations in the form of orders in council dealing with the public safety, the maintenance of order, the efficient prosecution of the war, and the provision of services and supplies essential to the life of the community. The following statutes gave the government the fullest possible powers to mobilize the resources of the nation in materials and men:

The Currency (Defence) Act, which authorized the use of the Exchange Equalization Account for war purposes.

The Import, Export, and Customs Powers (Defence) Act,

which empowered the Board of Trade to regulate or prohibit imports and exports.

The Ships and Aircraft (Transfer Restrictions) Act, which restricted the sale or transfer of ships and airplanes.

The Import Duties (Emergency Provisions) Act, which enabled the Treasury to alter customs duties at will.

The National Service (Armed Forces) Act, which made all male subjects aged 18 to 40 inclusive liable to registration and conscription.

The Control of Employment Act, which placed advertisements for workers by employers and the employment of workers in certain trades under the control of the Minister of Labour.

Another series of laws, such as the Rent and Mortgage Interest Restrictions Act, the Price of Goods Act, and a new Unemployment Assistance Act, dealt with the mitigation of the effects of the war upon the life and property of the civil population. Under these and other acts a series of orders flowed almost continuously from the various government departments dealing with civil defense, maximum prices of raw materials and foodstuffs, and other matters such as rationing. In November, 1939, all persons were required to register with a retail dealer of their own choice for butter, sugar, and bacon. In January, 1940, the weekly allotment of butter, bacon, and ham was restricted to four ounces per week per person, and the sugar ration was fixed at 12 ounces per week. These quantities were later changed, sometimes every month. In March, 1940, meat was rationed, on a value basis of 1 shilling 10 pence worth per week per person, with half that amount for children. Gasoline was rationed in September, 1940, with a monthly allowance for each car of an amount calculated to drive the car, regardless of size or horsepower, 157 miles. Gas, coal, and electricity were at first rationed at 75 per cent of the normal consumption, but later they were decontrolled. In all it is estimated that 40 per cent of all goods sold in a large London department store were rationed. These included bacon, ham, fresh meat, butter, margarine, cooking fats, jam, cheese, sugar, tea, fish, and clothing. There still remained a great many kinds of goods which were not brought under control. Rationing was for the most part worked through cards which had to be used at stores where the customer was known. Eggs and milk were controlled but their purchase was not subject to cards.

Agriculture

Since the experiences of the first World War had shown the importance of raising as much food as possible at home, both to avoid the dangers of the cutting off of food supplies by the submarine blockade and to conserve foreign exchange, the government early turned to the problem of increasing the productivity of British agriculture. The main outlines of the policy which was adopted involved controlled prices of feeding stuffs and the major farm products, controlled marketing of live stock, an increase in the arable area, with the plowing up of old pastures, the rationing of certain foods, and the raising of the wages of agricultural laborers to a parity with the wages of unskilled industrial workers.

The functions of various boards already described, such as the Potato Board, the Pig and Bacon Marketing Board, and the Milk Marketing Board were absorbed by the Ministry of Food. This same department became the sole buyer of fat beef cattle and most of the main agricultural products, and it took over the control of the prices of wheat, feeding stuffs, butter, eggs, potatoes, and oats. Perhaps the most important departure in agriculture was the abandonment of the practice of feeding meat animals intended for food on cheap imported feeds in favor of an increased production of direct human food such as wheat, potatoes, oats, and vegetables. Among livestock products milk was given priority, since milk production was believed to give a greater amount of nutriment from a given quantity of feed than any other product of animal husbandry. By abandoning the feeding of meat animals it was possible to conserve exchange, save shipping space, and to plow up and use for cereal farming four million acres previously used for pasture. The use of tractors was increased by perhaps 50 per cent. An agricultural survey provided information about the best uses to which each individual farm could be put. At the outset of the war England produced only one-third of the food required for her people; at the beginning of 1942 she was producing one-half.

Prices were not kept down, however, by these changes since they were accompanied, in July, 1940, by the increase of the statutory minimum wage for agricultural laborers to 48 shillings

per week, as compared with the average wage of 36 shillings then prevalent. In December, 1941, the minimum wage was increased to £3 (60 shillings) per week. Prices were raised to permit farmers to pay the higher rate. Farm prices rose by about 41 points (1927-1929 = 100) between August, 1939, when prices stood at 91 points and September, 1940, when prices had gone up to 132. By the beginning of 1942 they stood at 168.

The cost of living as far as food was concerned, however, did not show nearly as great a rise, since the price to the consumer was kept down by various government subsidies to processors and dealers. It has been said that subsidies of £52,000,000 per year were paid on bread and flour and home-killed meat and bacon alone. The Minister of Food himself estimated the total subsidies paid by the government to keep down prices at £82,000,000 per year.

Since a great proportion of British food still had to come from overseas, the Ministry of Food took over the control of most importations. It placed bulk contracts with overseas governments or with producers' organizations for wheat, sugar, meat, tea, cocoa, coffee, and dairy produce. Such products as oilseeds and minor cereals were purchased by agents of the ministry in foreign markets, and only minor categories of food importations remained in the hands of private traders. Generally speaking, the policy of bulk import, price control, and rationing provided an adequate supply of most foods, although occasionally supplies of certain types of food, such as milk, were insufficient to supply the permitted ration.

Industry

The three tasks envisaged for British industry were first, the production of more and more munitions and shipping; second, the maintenance of production for export, in order to provide the exchange necessary to meet the purchases of food, raw materials, and war supplies abroad; and third, the reduction of the output of consumers' goods.

During the first year of the war the progress of industrial mobilization remained sluggish. It is said that as late as June, 1940, only one-fifth of the productive capacity of the nation was devoted to war work. In other words, only one and a half hours

out of an eight-hour day went into the war effort. The defeat of France and the British disaster at Dunkirk startled England from her lethargy. "Business as usual" was given up in favor of almost no business at all. For a time during the summer of 1940 virtually the entire industrial resources of the nation were devoted to war work; but, since civilian life had to some extent to be maintained, the proportion of effort devoted to the war decreased again to perhaps two-thirds of the whole. The process of industrial mobilization was accomplished largely through the extension of government control over industry, including both capital and labor. Strikes were outlawed, and the free movement of labor from job to job restricted. Raw materials were exactly allocated to secure their most advantageous use, and the amounts permitted to be used for civilian consumers' goods were sharply curtailed. Moreover, a system of rationalization was introduced into industry with a view to the most effective use of plant, labor, and materials. In the women's hosiery industry, for example, production for civilian use was cut by two-thirds. All production was concentrated in four of the largest and most modern factories worked by a "combine." To this the various manufacturers were compelled to hand over their machines, workmen, trademarks, and clients in return for a share in the profits. All other factories in the trade were closed down. The machinery was converted to other war uses or melted into scrap, and the buildings were used for munitions production. In one case the owner of a hosiery plant which was shut down had made from £3,000 to £4,000 a year; as a member of the combine he received a dividend of about £150 per year. He was able to convert what was left of his machinery and plant to war work employing 50 persons (instead of 450 in the hosiery business) and he made a profit of perhaps £400 a year on his new enterprise. Among the hundred or so industries rationalized and "concentrated" were those engaged in making toilet preparations, gloves, sports goods, photographic supplies, musical instruments, toys, umbrellas, plastics, carpets, lace, hosiery, fountain pens, cutlery, pottery, jewelry, linoleum, and leather goods. All watchmaking was turned over to a single plant, 50 piano factories were reduced to 6, and the number of cotton-weaving factories was reduced from 750 to about 150. The smaller companies were simply put out of operation with no compensation for their machinery, patents, trade-

marks, or good-will, excepting a small share in the profits of the combine. There was no promise of a restitution of the pre-war situation after the war ended. Many luxury goods factories were closed down altogether.

As an effective factor in the reduction of civilian consumption the government relied on taxation. Not only were but small amounts of goods to be available for civilian use; the civilian population was not to have the money to pay for more. This reduction in civilian purchasing power was to be created by high taxes. The basic income tax rate was raised to 50 per cent. Owing to initial exemptions, the working classes were scarcely affected by the income tax, and it was borne almost exclusively by the upper and the middle income groups. The income tax consequently cut down consumption among the middle and upper classes, but it scarcely affected the masses of the people. Since the political power of labor was such that no politician cared to arouse the workers by applying the income tax to them, the only important fiscal check on their consumption was through their participation in the purchase of war loans (government bonds).

On the other hand, the earnings of the laboring classes probably increased by 100 per cent between 1939 and 1942, and since prices went up by only 80 per cent, there was a very considerable margin of increased purchasing power in the hands of the masses of the people which was not all diverted to the acquisition of government bonds. There was without question a great deal of buying of finer consumers' goods by the working classes, who had more money to spend than ever before. In the big London department stores sales kept the floors clear of pianos.

Consumers' Goods: Rationing

The most effective check upon civilian consumption proved to be neither taxes nor the purchase of government bonds, but the withdrawal of supplies from the market. Automobiles, tires, aluminum goods, vacuum cleaners, refrigerators, sewing machines, and phonographs simply ceased to be made, and many other goods, such as bricks, cement, plumbing fixtures, and paint, were not for sale to civilian purchasers. The factories where all these articles were made were converted to war production in whole or in part.

In those cases where goods were still being made, for the ordinary person the amount permitted to be manufactured was from a fifth to a half of the normal peacetime production. In many instances, though not in all cases, such supplies as were available were sold only on a rationing basis. In the matter of clothing for a man a suit and top coat represented two-thirds of his ration; a woman might buy a winter dress, a summer dress, a coat and an appropriate quantity of stockings and underwear. Nothing was said about the quality of the material, however. A shoddy suit took the same number of "points" from the coupon book as one of the finest saxony.

While rationing was favorably received, it led to the development of black markets for many goods. It did not, moreover, completely solve the problem of cutting consumer consumption to the limits thought desirable. When the freezing of wages which would cut consumption on the part of the working classes was suggested as a means toward this end, the leaders of labor refused unless prices were also frozen. The second step would, of course, have negated the purpose of the first.

Goods for Export

The policy of the production of goods for export on the existing levels had a double motivation. In addition to obtaining exchange for the purchase of imported supplies, the maintenance of exports would provide English goods for old customers and even make possible the opening of new accounts. Perhaps one or two illustrations of methods used will suffice. The entire wool clip of Australia, New Zealand, and South Africa was purchased by the government for the period extending to a year after the conclusion of the war. The amount of wool allocated for civilian home consumption was fixed at a very low level and the purchase of woollen goods was made subject to the use of ration cards. Exporters of yarn or cloth received certain allocations of raw material on very favorable terms and were then further encouraged to book foreign orders by being given a "preference ration" equal to 100 per cent of the quantity of their domestic ration of wool which they had used for export purposes in the preceding period, providing that the amount had been used for new business. Furthermore, in the ration for the next period the manufacturer

could ask for an addition to his basic ration of 75 per cent of the amount of wool used in new business in the preceding period, and thus the basic ration would be steadily increased until the plant was running to capacity. These regulations were changed from time to time and did not continue to put quite so much pressure on the manufacturer to prefer the export to the domestic trade.

In the rayon trade large funds were available for the development of the export trade, and during one year, 1940, the exports of rayon yarn were increased by 165 per cent and of piece goods (rayon cloth) by 49 per cent. This export business was managed by the Central Rayon Office which allowed a special rebate on rayon exported in any form. In 1941, when the lease-lend arrangements with the United States ended the necessity for securing foreign exchange in such large amounts, the policy in regard to exports was radically altered. Export business was favored only in so far as was necessary to secure exchange for goods outside lease-lend arrangements and in Latin America. Many manufacturers working on export business were hard hit by the shift in policy.

The Output of War Materials

Concerning the actual increase in the output of war materials little information is available. In a general way it was said in the spring of 1942 that Great Britain was devoting five or six hours out of every eight to war production. It is believed that there was a rapid transition to American methods of mass production, involving the use of the assembly line and continuous methods. At one time during 1941 seventy-five American consulting engineers were in Great Britain arranging automatic continuous production in everything from tanks to shoes.

It is also known that the government practically conscripted all civilians between the ages of twenty and fifty for war work. Three million women were already in war plants at the beginning of 1942, and two million more (all who did not qualify as housekeepers with small children) were expected to be drawn in shortly. In December, 1941, single women between 20 and 30 were made liable to conscription in the armed forces, civil defense, or munitions work. It was asserted that man for man Great Britain's industry was by this time fully as productive as that of Germany.

War Finance

At the beginning of the war the national income in Great Britain was estimated at £8,000,000,000. By 1942 the state expenditures were at the rate of £4,500,000,000 per year, of which four-fifths was devoted to war uses. Of this amount £1,500,000,000 were raised by taxation and £3,000,000,000 were raised by loans. Foremost among the taxes was the income tax with a basic rate of 50 per cent, subject to certain initial exemptions. A man with a wife and two children earning £250 (\$1,000) paid only one pound in income tax. Few workers, even those of the most skilled groups, earned more than this amount. On the other hand, a man with a wife and two children earning £1,000 a year (\$4,000) would pay something like £300 (\$1,200) to the government in income tax. The very rich were taxed as much as 97½ per cent. It was calculated that no one could keep more than £6,250 (\$25,000) after paying his tax, and that only twenty-five men in England actually had more than £4,000 (\$16,000) left after the payment of income tax was made.

In addition to income taxes, heavy excise taxes were laid on many articles and sales taxes or purchase taxes were introduced. While the tax burden on the middle and upper groups of taxpayers was heavier than in the United States, the total tax burden was lighter than it was in the United States, the difference in population being allowed for, even before the entry of the United States into war.

Remarkable as Great Britain's achievement in increasing production was, her population was still only one-half of that of Germany, and her effective machinery and supplies of raw materials were probably no larger than that fraction. The figures for iron and steel production during the 1930's are instructive on this point. In the years 1934-1938 inclusive Great Britain produced 7,000,000 tons of pig iron a year and 10,750,000 tons of steel. The maximum production was 8,490,000 tons of pig iron and 12,980,000 tons of steel in 1937. Germany, including Austria and the Saar, in the same years 1934-1938 inclusive produced on the average 14,400,000 tons of pig iron and 18,250,000 tons of steel, with a maximum production of 18,250,000 tons of pig iron and 23,000,000 tons of steel in 1938. The situation was made

much worse from the British point of view by the German annexation of the resources of France, Belgium, Luxembourg, and other areas in 1940.

The inadequacy of British production was apparent in other essential fields also. Fifty per cent of British food had to be imported at best. During the first year of the war the losses of British merchant ships through enemy action were 1,795,000 gross tons, and the losses of British, allied, and neutral shipping were 3,068,000 tons. From September, 1940, to February 1, 1941, the corresponding losses were 1,333,000 and 1,779,000 gross tons respectively. The losses of vessels engaged in the British carrying trade were made good during these months by the increased tonnage of allied and neutral ships placed at British disposal, by the capture of German and Italian ships, and by new building in British yards. But since there were no more allied and neutral ships to be rerouted and no more enemy ships to be taken over, and since the capacity of British shipyards was limited, there was bound to be a growing gap between sinkings by enemy action and replacements by building in British yards.

In the case of food, iron and steel, and ships the great recourse was purchase in America of additional supplies, which were available there in quantities sufficient to overbalance the German efforts. But such purchases rapidly exhausted the stores of British exchange throughout the world, and in 1941 it was obvious that they could not be continued except on some credit arrangement. This was provided by the lease-lend arrangement between the American and British governments, and as long as American stocks of goods were not needed for American use, an effective superiority over German production could be maintained.

In the last analysis the war brought about a system of complete governmental economic control over the individual, over plant capacity, and over the use and allocation of materials. In the process of speeding up war production the whole industrial and agricultural set-up was revised in the interests of efficiency. In industry particularly the large unit with continuous automatic production replaced the small factory, often individually or family owned. The workers were deprived of the right to strike but kept their trade union organization intact and were able to raise their wages faster than prices. Even though they were not in a position to buy more than a fixed amount of rationed materials,

there were still enough unrationed goods such as furniture and pianos to satisfy the psychological urge for higher living standards. It may yet prove that, as a result of the experiences of this war, the English working classes were able to win and hold a position superior to that which they enjoyed in 1939. The fate of most of the members of the old middle and upper classes, with their "quivering mass of new poverty," is more doubtful. Agriculture and industry, however, seem to be destined to maintain higher levels of production because of the efficiencies of rationalization and concentration which have been forced on them.

APPENDIX

Note on English Money

English money is expressed in terms of pounds, shillings, and pence. The system is based on the monetary arrangements of the Roman Empire, and the symbols in use are derived from abbreviations of the names of Roman units. The pound is denoted by the sign £, for *Libra* or pound in Latin, the shilling by *s.* for *solidus*, and the penny by *d.* for *denarius*. There are 12 pence in a shilling, and 20 shillings in a pound. Until 1931 the English £ was worth \$4.86, or in round numbers, \$5.00. A penny was thus worth about 2 cents, and a shilling, 24 cents. Today the £ is valued at about \$4.00.

Unfamiliar Terms

ALIZARIN, a coloring principle

BOOK OF RATES, the official valuations used for computing the values of goods for the purpose of levying customs duties

BUGLES, elongated glass beads

CONVERTIBLE HUSBANDRY, a system of farming in which the fields are plowed for a period and then converted to pasture

CARRACK, a large ship used by the Spanish and Portuguese

CARUCAGE, a tax levied on land at a certain rate for each caruca, or plowland of 120 acres

DANEGELD, a land tax, of which the proceeds were originally used to buy off the Danish invaders at the end of the tenth century

FERME, a contribution in grain or food for the support of the king

GAFOL, a rent or tax payable to the king, levied on land

GALLEY, a type of vessel used by the Venetians

HUSBANDRY, farming

IMPOST OR IMPOSITION, a customs duty levied by virtue of the royal prerogative

JUSTICIAR, a royal minister; at one time the highest official under the king

- MADDER, a plant of which the root is used for making a red dye
- MALTOTE, an arbitrary tax on wool
- MARRIAGE, a feudal fine, made by an heiress or widow for the privilege of marrying
- MAST, nuts and acorns used to feed pigs
- MERCHET, a fine paid by a serf for permission to leave the manor to attend a market
- MICHAELMAS, the twenty-ninth of September
- PANNAGE, grazing rights in woods, the pasturage of pigs on acorns and beechnuts
- RATES, local taxes
- RELIEF, a fine paid by an heir on entering upon a feudal estate
- RUNRIG, a Celtic field arrangement. See page 18 of text.
- SCUTAGE, "shield money," a payment made by a feudal tenant in lieu of military service
- SEA COALS, coal brought from Newcastle to London by sea
- TALLAGE, an arbitrary tax levied by the king on towns
- TALLY, a piece of hazel wood on which notches were cut, used in the Exchequer as a receipt
- UNEARNED INCREMENT, an increase in value of land not due to improvements made by the owner
- WOAD, a vegetable product used to prepare a blue dye used in the woolen cloth industry

CHRONOLOGICAL TABLE

	A.D.	A.D.
The Roman Period	43-	407
The Anglo-Saxon Period	449-	1066
The Norman Period: 1066-1154		
William I, the Conqueror	1066-	1087
William II	1087-	1100
Henry I	1100-	1135
Stephen	1135-	1154
The Plantagenet Kings: 1154-1485		
Henry II	1154-	1189
Richard I	1189-	1199
John	1199-	1216
Henry III	1216-	1272
Edward I	1272-	1307
Edward II	1307-	1327
Edward III	1327-	1377
Richard II	1377-	1399
Henry IV	1399-	1413
Henry V	1413-	1422
Henry VI	1422-	1461
Edward IV	1461-	1483
Edward V	1483-	1485
Richard III		
The Tudor Period: 1485-1603		
Henry VII	1485-	1509
Henry VIII	1509-	1547
Edward VI	1547-	1553
Mary	1553-	1558
Elizabeth	1558-	1603
The Stuart Period: 1603-1714		
James I	1603-	1625
Charles I	1625-	1649
The Commonwealth and Protectorate	1649-	1660

The Restoration	
Charles II	1660-1685
James II	1685-1688
The Revolution of 1688	
William and Mary	1689-1702
Anne	1702-1714
The House of Hanover (changed to House of Windsor during the World War): 1714-the present	
George I	1714-1727
George II	1727-1760
George III	1760-1820
The Beginning of the Industrial Revolution	
The Napoleonic Wars	
George IV	1820-1830
William IV	1830-1837
Victoria	1837-1901
The Ministries of Peel, Gladstone and Disraeli	
Edward VII	1901-1910
George V	1910-1936
The World War	
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